Scientific American.

A JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, AGRICULTURE, CHEMISTRY, AND MANUFACTURES

VOL. V.---NO. 16. NEW YORK, OCTOBER 19, 1861. NEW SERIES

Wines Should be Made Without Sugar.

Dr. Flagg, of Cincinnati, well known for his connection with Nicholas Longworth in the extensive production of native wines, contributes for the *Country Gentleman*, the following protest against recipes for sugared wines :—It is not by mashing up sour, wild, unripe grapes with water, sugar and whisky, that our farmers are to become wine-growers, however well the mixture may please the palates of unsophisticated women and children, and hard working men, whose olfactories never knew any other wine than Madeira of American manufacture. Tell them that good wine is never made of sugar in any part of the world, and that to weaken with water, or strengthen with spirits is downright wickedness ! The grapes must be fully ripe, dropping off ripe, and to render them so the vines must grow on stakes or very low trellises. The expressed juice must then be put into clean "wine green" casks, and cared for very much in the same way good cider is managed. This done faithfully, and the product will be wine that will not ferment over again in the stomach, deranging the livers and muddling the brains.

All tricks of adulteration and debasement our people will take to naturally enough by mere virtue of their nationality, and without being told. After they shall have learned how to make good, pure wine, then they may, for home use, make a cheap beverage in the following way. Into a large cask fling the cheese from the winepress, after all the juice is extracted, or else well mashed wild grapes of good flavor till the cask is half or two-thirds full ; then fill up with water and add one pound of sugar to the gallon of water ; let the fermentation begin and complete its work in the cask, and then draw off the clear wine and put away in as cold a cellar as you have, and keep it well filled and closed up. Drink it within the year.

Great Water Barometer.

A water barometer which had been constructed 30 years ago by Prof. Daniell, in London, was lately removed and put up in the Crystal Palace at Sydenham. The glass tube is about 34 feet long, and it was filled with water from which every particle of air had been driven by a jet of steam from a boiler. The steam was permitted to pass into the tube which had its lower part situated in a vessel filled with distilled water, and upon a vacuum being formed in the tube, and its top hermetically sealed the water ascended in it to a hight of 32 feet 9 inches. This is equivalent to a column of 28.84 inches of mercury. A water barometer is superior to a mercury one for observing the changes of pressure in the atmosphere. For the variation of one inch of mercury a variation of more than a foot of the column of water takes place in a barometer. Many oscillations of the atmosphere may be noticed by a water barometer that would escape observation in one with a column of mercury.

During gales of wind it is very interesting to witness the oscillations of a barometric column of water situated in a quiet apartment. In the inside of the long glass tube the water trembles and sometimes moves rapidly up and down as if animated by a spirit. These movements are records of the unseen but not unfelt waves of the aerial ocean which surrounds our globe.

GWYNNE'S PATENT GAS CARBONIZER.

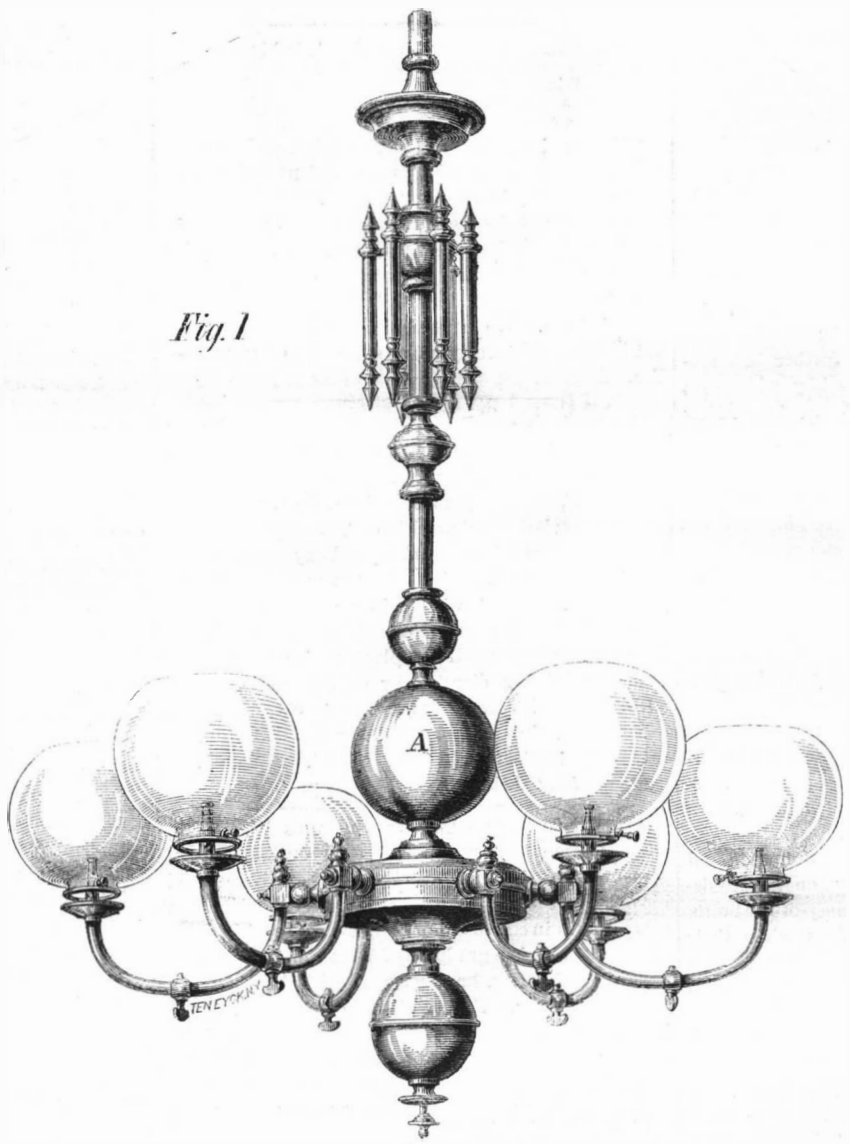

Fig. 1

Improved Gas Carbonizer.

Most persons know that illuminating gas is composed of two elements, hydrogen and carbon. The hydrogen in burning generates a great deal of heat but very little light ; the light coming almost wholly from the carbon. The light that comes from the carbon is not produced in the act of combustion, but is emitted from the intensely heated carbon before it is consumed. If atmospheric air is mixed with illuminating gas so as to burn the carbon instantly as it is heated, the combustion will be more perfect and the heat will be increased, but scarcely any light will be given off. This plan is adopted in stoves for cooking by gas, where heat is wanted and light is not particularly desired.

Hydrogen and carbon combine in very numerous proportions, forming a long list of substances, known as a class under the name of hydrocarbons. In some respects they differ very widely in their properties but they are all combustible, burning with both light and heat ; though, as a general rule, those that are richest in carbon produce the most light, while, as a universal rule, from an established law in chemistry, those that are richest in hydrogen produce the most heat. Illuminating gas is a mixture o two hydrocarbons, light carbureted hydrogen, each atom of which consists of one atom of carbon, *, combined with two atoms, OO, of hydrogen, O*O ; and heavy carbureted hydrogen, the atom of which is formed by the combination of two atoms of hydrogen with two of carbon, O*O*. Though the heavy carbureted hydrogen constitutes but about one-sixth part of ordinary illuminating gas, it produces nearly all the light ; not merely from the greater proportion o carbon which it contains, but probably also because its carbon remains a longer time in a heated state before it is burned.

It has long been known that the brilliancy of illuminating gas is greatly increased by mixing with it the vapor of some hydrocarbon which is rich in carbon, and many attempts have been made to render this property available in the economical lighting of dwellings. The principal obstacle encountered has been the condensation of the vapor of the hydrocarbon employed ; a result always occurring whenever the vapor is carried through any considerable length of pipe. This difficulty is overcome in the most simple and effectual manner in the invention here illustrated by simply placing the reservoir containing the hydrocarbon to be evaporated in the immediate neighborhood of the burner.

A hollow globe, A, Figs. 1 and 2, is introduced into the gas fixture in the position shown in Fig. 1. This globe is partly filled with naphtha, benzole, or other suitable liquid hydrocarbon, and the illuminating gas is brought into it at the top through the pipe, B. The gas passes down through the hollow wick, C, into the liquid, and rising charged with the vapor,

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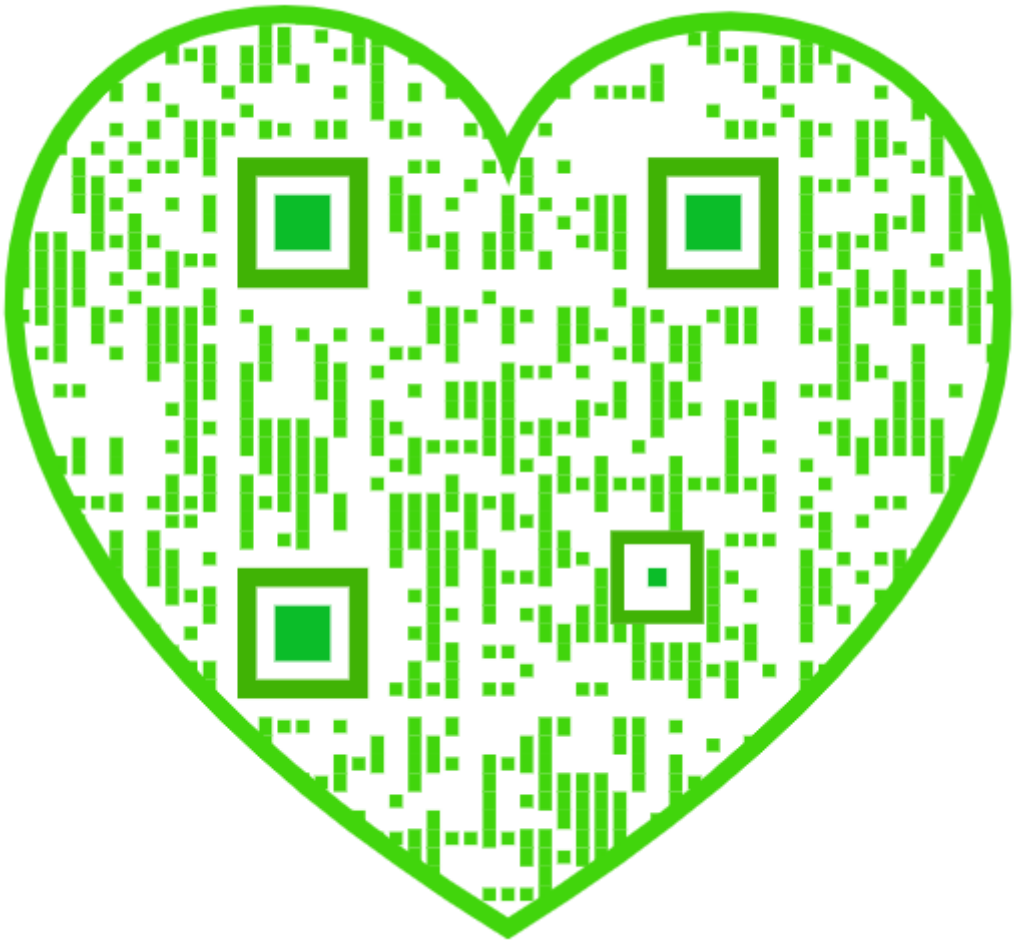
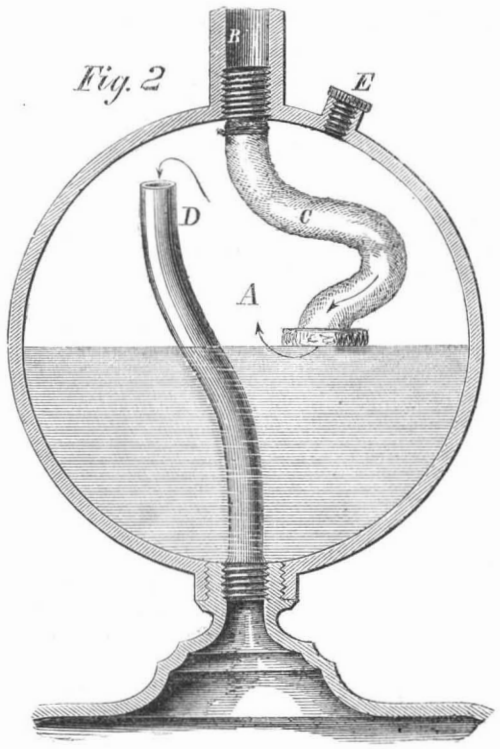


passes out through the pipe, D, to the burner. The lower end of the wick, C, is supported by a float resting upon the liquid, and thus follows the surface down as the liquid is consumed. The pipe, D, rises above the level of the filling tube, to prevent all danger of its ever receiving any liquid.

The Company which manufactures this carbonizer guarantee a saving by its use of 33 per cent in the gas bills, and the production of a better light than that of the city gas. The inventor says that an article of naphtha is now obtained which is free from any objectionable odor.

Fig. 2



The patent for this invention was granted to the inventor, W. H. Gwynne, through the Scientific American Patent Agency, April 30, 1861, and further information in relation to it may be obtained by addressing the Carbonized Gas Company, 476½ Broadway, New York.

THE WAR.

THE SITUATION.

The hostile forces are facing each other along a line of about 1,100 miles, extending from the western boundary of Missouri to the eastern edge of Virginia. The secessionists have possession of nearly half of Missouri, about a third of Kentucky and three-fourths of Virginia.

In Missouri, General Fremont was, at the last accounts, at Jefferson City, which is on the Missouri river, almost exactly in the center of the State, mustering his forces for an attack on the main army of the secessionists under General Price.

In Kentucky, the secession Generals, Johnston and Pillow had a large force at Columbus, on the Mississippi, which forms the western boundary of the State, where they are entrenching themselves, while their headquarters are at Bowling Green, a little more than one-third of the length of the State from its western boundary, and just about a third of the width of the State from its southern boundary. When last heard from, General Buckner, with 3,000 rebel troops, was some forty miles northeast of Bowling Green. In the southeast part of the State, a considerable army of secessionists under General Zollicoffer, had taken possession of Cumberland Gap at the junction of two important roads. All these bodies of secession troops were ravaging the country, plundering the inhabitants, and carrying off the slaves of Union men to sell them at the South. The headquarters of the Union forces are at Louisville, on the Ohio river, though we have troops stationed along the Louisville and Nashville railroad, forty-two miles, to Elizabethtown, Bowling Green, being seventy-one miles farther on the same road. The advanced guard of the secessionists is very near Elizabethtown. A large body of Union forces under General Grant is being concentrated at Paducah on the Ohio river, at the mouth of the Tennessee river, and fifty miles above the mouth of the Ohio. The place is regarded as one of great strategetic importance, and is being fortified, and brought in communication with the State of Illinois by a bridge across the Ohio.

In Western Virginia Generals Rosecrans and Schenck are in the upper portion of the valley of the Kanawha, in the angle of the New and Gauley rivers, where they unite to ford the Kanawha, and General Cox was, at last accounts, at Big Sewal mountain, some fourteen miles farther to the southeast, in pursuit of the enemy. About sixty miles northeast from Big Sewal mountain is Cheat mountain, where a Union army is stationed under General Reynolds. General Banks still remains in his intrenchments at Harper's Ferry, guarding the upper Potomac, and the main army, under General M'Clellan, in its lines south of Washington, is perfecting its discipline and collecting its artillery preparatory for the important operations expected of it. The great army of the secessionists under Beauregard, is also drilling and arming in its lines at Manassas to the southwest of our forces, and the early frosts of Autumn will doubtless witness the greatest battle between the two armies that has ever taken place on this continent.

The able and veteran General Wool continues at Fortress Monroe. General Mansfield has gone to take command of our forces on the coast of North Carolina. There are reports of important naval expeditions, the destination of which is not disclosed, and there is no doubt that we shall soon be in receipt of very stirring intelligence.

QUARTERMASTER-GENERAL Meigs is admirably managing the thieves and plunder-mongers who infest Washington. They find it impossible to move him. Not even the written request of a cabinet member will move him a hair in the matter of a contract.—*Ex.*

[We have long known General Meigs, and are fully prepared to endorse him as an efficient and upright officer. It would be a gratifying fact if the same compliments could be bestowed upon all who are now patriotically serving their country. It is hinted by knowing ones that in the purchase of horses for the use of the government a well-laid scheme of plunder is carried on. We have no specific charges to make, but have quite recently heard some curious rumors.—EDS.

THE gunboat *New Era* left St. Louis on Thursday for the Missouri river. She has three hundred men on board all prepared with rifles. The vessel is shot and shell-proof, and has speed enough to select her own position with celerity and precision. The engine, boilers, and wheels, are all protected beyond any peradventure by heavy iron, and the sharpshooters and gunners, and all others on board, will be in no danger whatever from bullets from shore. Her Dahlgren guns—eighty-four pounders—are all in place, under bomb-proof decks, and being directed by experienced gunners, will destroy with the greatest ease any obstacle within a distance of three miles. The *New Era* will prove an invaluable institution on the Missouri. She can't be sunk, perforated, burned, or blown up.

ANOTHER TRAITOR.—Captain Gustavus W. Smith, who for some time past held the responsible office of Street Commissioner of this city, has recently resigned his office and is now a Major General in the Secession army, and is in command of a division of rebel forces at Manassas. He is a graduate of West Point and is said to be a good officer, having served with distinction in the Mexican war. For months past this man Smith had enjoyed a lucrative office and now he places himself in a hostile attitude to those who have harbored and befriended him.

SALT WORKS DAMAGED.—During the great storm which took place on the night of September 27th, the Kanawha river rose 11½ feet higher than it was ever known before. The Virginia salt-works are situated in the upper section of this valley, and most of these received great damage. In many cases the buildings and machinery were swept away, and it is stated that these cannot be replaced again until peace once more reigns in the valley of Kanawha, and the opposing armies have departed.

THE "fortifications" at Munson's Hill had no glaces, no ditch, no guns. A log of wood, painted black on the end, was the supposed 44-pounder, which our reconnoitering parties saw pointed toward Washington.

Cotton Crop of the United States for 1861.

The usual yearly circular of the annual cotton crop of the United States has just been issued from the office of the *Shipping and Commercial List*, 58 Pine street, this city. Great difficulties attended the preparation of the statistics, this year, owing to the unsettled state of the country, but the editor says, "we feel assured that the statement as a whole will be found very nearly correct." The following statistics are obtained from it:—The entire crop of Louisiana was 1,751,599 bales; Alabama, 546,794; Texas. 144,747; Florida, 121,172; Georgia, 477,584; South Carolina, 336,339; North Carolina, 56,295; Virginia, 78,132; Tennessee, 143,424, making a total of 3,656,086 bales. The crop of 1860 was 4,669,770 bales. There has, therefore, been a decrease last year from the crop of the previous one of no less than 1,013,684 bales.

The exports to foreign ports were, to Great Britain, 2,175,225 bales; France, 578,063; North Europe, 216,250; other ports, 158,030. Total, 3,127,568. This is a total decrease from the previous year's exports of 646,605 bales, of which 494,207 is allowed for England. The total consumption in the United States, including that which was burned in several places, was 843,740 bales, of which 650,357 were used north of Virginia; this amounted to 128,303 less than the previous year. To the above statistics of the cotton crop the *Commercial List* states that there may be cotton detained in the interior, and on its way to market, that would raise the product to 3,866,000 bales. The decrease of crop is certainly large. About 300 bales of the new cotton crop had been received up to Sept. 1, against 51,600 for the same period in 1860. Owing to the enormous quantity of American cotton hitherto required by England for her manufacturing industry, she must suffer more than any other country by the blockade of the southern ports. By the latest news from Europe cotton had made another advance of one cent per pound in Liverpool. It may yet become dearer than the finest wool.

Chicago Grain Receipts and Shipments.

The receipts last week, compared with the week previous, showed a large increase in the three leading articles of flour, wheat and corn, as well as some increase in the minor articles of oats, barley and rye, bringing the aggregate up to within a trifle of the heaviest weeks of the season. The aggregate receipts for six weeks have been: last week, 2,107,930 bushels; week previous, 1,740,830 bushels; week previous, 1,842,675 bushels; week previous, 1,823,068 bushels; week previous, 2,221,572 bushels; week previous, 2,235,219 bushels. The shipments by lake last week were also heavy, but not exceeding the receipts, which they had done for three weeks before, while in addition the eastern railroads take 30,000 to 40,000 barrels of flour per week. The aggregate shipments by lake last week were 1,842,765 bushels; 1,804,523 bushels in the week previous; 2,100,137 bushels in the week previous, and 2,221,839 bushels in the week before that. No precise report of flour and grain in store has been made for several months. The following is the estimate of the Superintendent of the Board of Trade at this date: Flour, 7,250 barrels; wheat, 715,428 bushels; corn, 1,653,311; oats, 197,933.—*Wells' Commercial Express, Oct. 3d.*

PROPOSALS FOR BEEF.—The government is again inviting proposals for furnishing beef on the hoof. Proposals will be received until the 21st of October. The government will take from 4,000 to 6,000 head. The maximum weight must not exceed thirteen hundred pounds, and the minimum one thousand. The cattle are to be delivered at Chambersburg, Harrisburg or York in Pensylvania. The government reserves to itself the right to pay in Treasury notes or other funds it has for disbursement, and to reject any bid and for any cause. No bid will be entertained unless the bidder is present to respond.

THE LIME-LIGHT.—The English Trinity Board have decided upon giving the lime-light three months' trial for lighthouse illumination. This light has been substituted for the ordinary oil-lamp of Fresnel, in the South Foreland lighthouse, where it will be continued for the next three months. The effect is very brilliant, although it is not equal to the magneto-electric light, which was for a long time in use at the same lighthouse.

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THE POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

In consequence of the monthly meeting of the American Institute occurring on Thursday evening, Oct. 3d the meeting of the Polytechnic Association was held Wednesday evening, Oct. 2d.

COAL TAR.

Professor SEELY being called upon by the President to give, in accordance with his promise, some facts in regard to coal tar said—A very few years ago coal tar was not only a perfectly useless substance, but was generally regarded as a nuisance. When it was first proposed to light the city of Philadelphia with gas, a number of the prominent citizens sent in a protest to the city authorities against the measure, on the ground that the coal tar would poison the waters of the Delaware, and prove generally offensive. Among the signers of this protest was no less a man than Professor Cresson, the eminent engineer of the Philadelphia City gas works. At present there are few substances known that yield a greater variety of valuable and interesting products than coal tar.

There is no tar in coal. Coal though not a simple, is a single substance. It is composed of oxygen, hydrogen, nitrogen and carbon. By exposure to heat the chemical combination is broken up, and the element combine in other proportions, forming about fifty new substances; some of which take the gaseous form, some the liquid, and others the solid. Illuminating gas is a sample of the gases, benzole is one of the liquids, and naphthaline one of the solids. The substances produced and their proportions to each other vary with the temperature at which the destructive distillation takes place. In making illuminating gas the coal tar is formed in a state of vapor, but condenses on the reduction of the temperature into the heavy viscid liquid with which we are all familiar. If this tar is placed in a still and exposed to a gradually increasing temperature, the substances of which it is composed are evaporated in succession, of course the more volatile passing over before those that are less so. The first that comes over, forming about one-twentieth of the whole mass, is a mixture of substances, known in commerce under the name of naphtha. It is used in the india-rubber manufacture, in making varnishes, for burning, and for other purposes. Then comes the "dead oil," an exceedingly complex mixture of substances; more than forty having already been separated. Behind the dead oils there is left in the retort a heavy liquid called coal-tar pitch. This is a single substance, but may be decomposed by destructive distillation, the elements forming new compounds, solid, liquid and gaseous; as in the case of coal.

Among the substances which unite to form naphtha is benzole, a pint of which is found in two or three gallons of naphtha. This is the most interesting of all the substances procured from coal tar; for from it the beautiful dyes are obtained. On the mixture of nitric acid with benzole, the two substances combine chemically forming nitro-benzole. By treating the latter with nascent hydrogen, aniline is formed, and from aniline the brilliant and delicate colors, mauve, magenta, solferino, &c., are produced by oxydation.

Aniline is produced from indigo and from other sources, and it is probable that we shall soon be able to make indigo from coal tar.

THE FORMATION OF COAL.

A general conversation then took place on the subject of the formation of coal.

Mr. VEDDER suggested that the bitumen in the lakes of Trinidad was formed from trees growing on the banks of the lakes and falling into the water.

Mr. NASH—Coal was formed from animal matter, whales and other fish dying and sinking to the bottom of ancient seas.

Dr. STEVENS—What is coal? The answer will depend upon the kind of coal we take for our standard. If we call the best sample of white ash Lehigh anthracite coal, containing 90 per cent of carbon, our type, and then compare all other varieties found in the United States, we should have but few samples of coal. This might be called an extreme case. It is granted. On the other hand, if we take for our standard any dark, stone-like looking substance, which will ignite and burn, giving off flame and heat, we should have an extreme on the other side—neither of these extremes would be correct. Practically, the following has come to be a division of coal into several kinds or grades:—Coals without or with but little flaming qualities, or containing but little bitumen, are called *anthracite*. Coals emitting a flame for a short period, a *semi-anthracite*, containing 73 per cent of carbon and 13 per cent of bitumen. Coals containing 50 per cent of carbon or more, and 40 per cent or more of bitumen with 50 or 60 per cent of ash, *bituminous coal*. Coals containing a smaller per cent of carbon than bitumen, a *cannel coal*, and if a sample resembling cannel contains more than 40 per cent of ash, it is called *bituminous shale* or *shist*. A still further division of the cannel could be made with a clearer conception of the great subject. All those cannels containing a very small per cent of ash, say 2 or 3 per cent, and 85 or 90 per cent of bitumen, we should call *fossil bitumen*, and among these we should class the famous boghead of Scotland and albert coals of New Brunswick. When coal was first discovered on the coast of Wales—thrown up by the waves of the sea—it was supposed to have its origin in the sea, and hence was called sea coal. It was supposed by learned theorists to be a sediment of the ocean. This theory is still maintained by some scientific gentlemen—Ocken has an axiom, "All is from the sea." As the subject was investigated the vegetable origin was broached, and it was supposed that forests were overwhelmed by floods, and buried beneath the bosom of the ocean. By others that wood was carried out to sea by the outflowing of mighty streams, and becoming water-washed sank to the bottom, and being gathered together in eddies, was finally covered over by mud and sand, and then was changed into coal. Others have supposed it was somehow or other a growth under ground. The most probable theory, the one that conforms to most of the phenomena attending the investigation of beds of coal, and coincides with the phenomena of living vegetation, is, that each bed of coal was the growth of ancient mosses—in fact a fossil peat bog, and consequently of vegetable origin. All coal, whether anthracite or semi-anthracite, bituminous or semi-bituminous, is derived from vegetable transformation.

Chemical proof.—Woody fibre, according to Bischoff, may be converted into coal. 1st, By separation of carbonic acid and carbureted hydrogen. 2d, By the separation of carbonic acid and water. 3d, By the separation of carbureted hydrogen and water. 4th, By the separation of carbonic acid, carbureted hydrogen and water. Upon destructive distillation bituminous coal yields the same hydrocarbon products as woody fiber.

According to Liebig when from the formula of wood	C36 H22 O22
We subtract 3 atoms of carbureted hydrogen	C3 H6
Three atoms of water	H3 O3
And nine atoms of carbonic acid	C9 O18—C12 H9 O21
We have the composition of mineral coal	C24 H13 O

Microscopic proof.—The ash of coal, under the powers of the glass, exhibits the pores, vessels and cellular structure of the particular order of plants of which it was formed, whether resinous or otherwise.

Botanical proof.—The leaves, flowers, fruits, barks and boles of trees are converted into coal. Sometimes the bark is coal while the bole is petrified.

Geological proof.—Each individual bed of coal has three distinct elements, which are never confounded or relatively changed, except by some immense power which has been exerted over a large extent of country. 1st, The floor or bed of clay, called fire-clay, stigmaria clay, brick clay. This is filled with rootlets of coal plants, is usually of basin shape, and we suppose was the soil of the coal vegetation. 2d. The bed of coal in its natural position is level, stratified and homogeneous in structure. 3d. The roof always differs from the coal or clay. It may be shale, bituminous shale, sandstone or limestone. So distinct is the roof from the floor that the bed of coal may be inverted, or placed at right angles with the horizon, and still the practical miner will tell at a glance the one from the other.

Anthracite coal was bituminous coal originally, the volatile matter having been expelled by heat, chemical change, or metamorphosis.

Proof.—The Lackawana basin of Pennsylvania, on its western edge, contains more volatile matter in the coal than on its eastern edge, the western edge being further removed from the metamorphic action of the Lehigh region; while west of the Alleghanies, where the metamorphic action never reached, anthracite is not found. In the coal of Deep River, N. C., the bed is cut across by a dyke of trap; and as far as the heat of the trap rock extended, the highly bituminous coal of this basin is converted into anthracite. Now trap, all geologists admit, was once a fluid rock, ejected from beneath through the superimposed rock through fissures or rents.

Bitumen may be derived either from the transformation of vegetable or animal organism, or both. Geological cabinets contain specimens of vegetable matter converted into *bituminous shale* and fish, reptiles, and other animal structure always into bitumen, and never into true coal. Cannel coals may contain a large amount of animal bitumen. Cannel changes into bituminous shale, never into anthracite. Lignite is vegetable organism carbonized and bituminized, the transformation arrested before its completion; the vegetable structure still retained in part, and never homogeneous, like true coal.

How came the vegetable growth of ancient worlds to be thus transformed into mineral coal? By what process can we conceive of metamorphic action operating through many distinct strata and over great expanses of territory? If we can conceive of the American continent flattened out, so that our highest Alleghany mountains become plains, and the general elevation of the land but little above that of the surrounding waters, similar to the Everglades of Florida, we should gain in our latitude about six or seven degrees of mean temperature; add to this depression of the continent an expansion of the Gulf of Mexico northwards to the Canadian Provinces, filling up the whole interior, the territories of Colorado, Kansas and Nebraska. Owing to this vast body of warm water lying to the west of us, and to prevailing westerly winds, we should gain ten or twelve degrees more of mean temperature—sufficient to give us long seasons for the growth of vegetation, and short winters for the annual death of the same. We should have almost a tropical climate. To this supposition we have also to add that there was probably a vast variety of plants then living allied to living species in tropical regions, but adapted for growth in colder climates. If we can conceive still further that, after a series of peat bogs had been filled with peat, all in the same horizon, and extending from Nova Scotia to the southwestern boundaries of Texas, and then the United States quietly to sink below the level of the sea, by a chemical change easily understood by the chemist, the peat would be coverted into coal, and we should have the first or lower beds of coal formed in our country. Successive periods of quietude for the peat plants to grow and become converted into peat, followed by successive periods of subsidence of the continent, continued long enough to have forty beds of coal formed, and fourteen feet or more of intervening strata deposited, and we would have the whole of the coal measures of the United States formed by causes and laws, of which we are every day cognizant.

Subsequently, in the order of time, the whole northeastern portion of North America was elevated from beneath the waters of the ocean by a force exerted from the Atlantic Ocean or southwestwardly, and of sufficient power to corrugate the surface into great folds, giving the mountains of eastern Pennsylvania, Virginia, and the Alleghanies. This force had its maximum intensity on the east, and minimum on the westward; consequently the coal basins were more disturbed, dislocated, fractured and upturned at the east; while to the west, where the force did not reach, the coal basins are found in the position and retaining the form in which they were originally produced.

ARIZONA WAR MATERIAL.—We notice, says the Mesilla *Times*, the establishment of cannon foundries at several points in Texas, among others at Lavaca, at which point several hundred thousand pounds of Arizona copper is now stopped from being shipped by the blockade. We suppose this is the material from which the citizens of Lavaca propose to make their cannon. We can turn out copper enough from the mines now in operation, to keep the whole South in material for cannon. They have been made here and, if the emergency presents itself, can be manufactured again. The Americans took at the battle of Sacramento, in Chihuahua, six cannon, excellent and effective pieces, that were made from the copper of the Santa Pito mines in Arizona.

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THE HENRY RIFLE.

We take the following account of this famous weapon from *The Ironmonger* :—

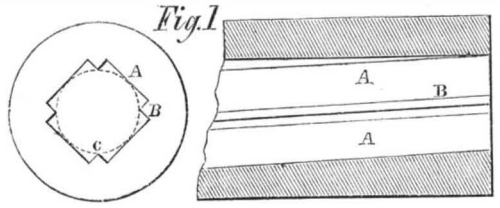
At the close of last year we heard that some extraordinary practice had been made with a new rifle, patented by Mr. Alexander Henry, the well known gunmaker of Edinburgh, but as we could not obtain any information respecting the peculiar construction of the weapon, we concluded that its wonderful accuracy at long ranges was mainly owing to good workmanship. We imagined that the skillful gunsmith had turned out a very fine poly-grooved rifle, the novelty of which merely consisted in the number and form of the grooves. We never suspected that he had hit upon an entirely new principle in rifling fire-arms, and had produced a weapon far surpassing the famous Whitworth in precision. Had he been a military man, an engineer, or anything but a professed maker of guns, we should probably have given him credit for some originality.

At the meeting of the National Rifle Association on Wimbledon Common, inJuly last, the Henry Rifle was first brought before the notice of our English marksmen, who were amazed at its performances. Sixteen important prizes and most of the pools were won with the new arm. Major Moir used it in the contest for the Prince Consort's Prize of £100, which he eventually carried off. Seven shots were fired at each of the ranges, 800, 900 and 1,000 yards, and the winner made twenty-one points. On the last day of the meeting an interesting match came off between Oxford, with the Whitworth, and Cambridge, with the Henry. Each University was represented by two of her best shots. The contest was got up for the purpose of testing both men and rifles. The Cambridge men were undoubtedly the finest marksmen, but their extraordinary score, which, if we remember right, doubled that of their competitors, is partly to be accounted for by the superiority of the Henry Rifle. Mr. Peterkin, with thirty shots, ten at each range, 800, 900, and 1,000 yards, obtained thirty-one points, the highest score ever made on Wimbledon Common at these great distances. Some wonderful shooting was made at the pool targets with the new weapon. Serjeant Dillon got eleven consecutive two-inch bull's eyes at 100 yards. Lord Elcho with seven shots at 200 yards, made six consecutive four and a half-inch bull's eyes and one center.

At the recent meeting of Scottish marksmen at Montrose, the Henry has again made itself heard. With it Mr. Edward Ross won Scotland's Cup, and the first long-range prize or Stranger's Cup. Major Moir succeeded in carrying off the third prize with the very weapon which had proved such a trusty friend at Wimbledon.

In one of the early trials of the rifle Mr. Henry himself fired six shots with it at the extraordinary range of 1,100 yards, and hit the target with every ball, except the first, making three centers and two outers. At the mile range he afterward hit the target, which was six feet high by ten wide, three times out of seven shots. Several military men witnessed this wonderful shooting. In a quiet trial of skill between the famous marksman, Mr. Edward Ross, and his father, "the old deer-stalker," near Aberdeen, the precision of the new weapon at long distances was strikingly shown. The ranges were 800, 900, and 1,000 yards, and each competitor fired ten shots from a Henry at each range. The father made with his thirty shots, thirty-four points ; the son no fewer than forty-three points, only missing the target once. Capt. Moir, on the 23d of April, fired twenty-one shots with this arm at 1,000 yards, and got seven centers, twelve outers, and two misses, counting twenty-six points. These examples of practice made with the Henry will suffice to account for the popularity of the arm. Though its history only begins in 1860, it is now the favourite weapon of many of our most skillful marksmen, and it is generally selected for the first prize by County Rifle Associations. We will now endeavour to describe the most striking features of Mr. Henry's invention. In his specification he claims a system or mode of rifling or grooving firearms, in which a series of planes or flat surfaces are combined with angular, curved or rectangular ridges or "lands." In the explanatory sheet of drawings several modifications of this improved mode of rifling are shown. From four to ten planes and ridges are used in the various forms of the new rifle. The simplest modification is shown in Fig. 1. This barrel is rifled so that its end view or transverse section forms a quadrilateral figure, with angular projections, or "lands," extending inward from the angles of the planes. The periphery of the projectile, *c*, indicated by a dotted circle, touches the center of each plane, *a*. In addition to the bearing surfaces thus obtained there are the angular ridges, *b*, which project inward, so that the apex of each is exactly concentric with the centers of its contiguous planes. These four ridges thus afford a further bearing or support to the projectile. These angular ridges also fill up to a great extent the spaces between the angles of the planes, A, and the periphery of the projectile, thus reducing the windage

Fig.1

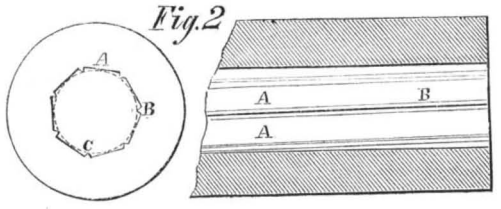


by lessening the amount of expansion necessary to cause the projectile to fit the grooves of the rifle or other fire-arm, so that the rotary or spiral motion of the projectile is obtained with greater certainty, and consequently its flight is rendered more accurate.

Mr. Henry rarely makes rifles with this quadrilateral bore, but the figure shows this principle so clearly that we have reproduced it here.

In Fig. 2 the favorite modification is shown :—There are seven planes, A, and a corresponding number of intervening ridges, B, which together afford fourteen points of bearing to the projectile, C, which very nearly fills up the whole of the bore. This is the form of the ordinary Henry. Rectangular or rounded ridges are occasionally substituted for the angular ones shown in the diagrams.

Fig.2



In another modification of the new system of rifling, curvilinear grooves are combined with a series of planes. The planes form a polygon, but in the center of each plane a curved groove is formed, and the ridges or boundary lines of the grooves form the bearing points for the projectile.

A larger charge of powder may be used with fire-arms rifled on Mr. Henry's principle than with others, as there is less liability of stripping the bullet. The increased charge gives a lower trajectory, and ensures greater accuracy in the flight of the missile.

The bore of the Henry is somewhat larger than that of the Whitworth, and the ball is about the same length. The ball fits easily into the barrel, and there is very little recoil. The advantage of the bore seems to lie in the extent of surface which is made to present a resistance to the shifting of the ball in the slightest degree from the grooves, which give it its rotary motion and direction, and in the perfect manner in which the expansion of the ball fills the grooves. The resistance of the air to the ball is so slight that at the marker's butt at the mile range, neither the report of the rifle nor the whistle of the ball is heard ; and it is only by the ball hitting the ground or the target that the marker knows when a shot has been fired.

The arm does not foul so rapidly as other muzzle-loaders ; indeed we heard the other day of a Hythe instructor who had been firing with a Henry for two months, and had never thoroughly cleaned it.

Mr. Henry's patent wind-gage sight is a beautful and simple contrivance for regulating the aim according to the strength of the wind. The sight, either back or front, can be moved to the right or left by an ordinary watch key, and when set to the proper degree it may be shaken or handled without fear of altering its position. With the back windsight, if the wind blows from the right the sight must be moved to the right, and with the front windsight, to the left. The degrees are marked by alternate lines of gold and platinum.

The wonderful practice made with Mr. Henry's rifles proves that the principle upon which they are constructed is a good one.

The Wool Trade.

The wool trade was marked, during the month of September, by unusual activity in the New York market. The transactions comprised all kinds of domestic fleece and pulled wools, but they were confined chiefly to low and medium qualities, which rose rapidly in price. The sales quite exhausted the supply of pulled wool, and there is said to be put little fleece wool now in a condition to be sent to market, the late demand for it having consumed it faster than it can be prepared for sale. The California and Texas wools have been nearly all disposed of. Sales of the new California clip, yet to arrive, being already made. The same briskness of trade in this article has sensibly effected fine foreign wools. All descriptions of medium and low qualities of foreign wools have met with quick sales at advanced prices, and the markets have been swept of nearly everything of that nature. The new clip, from the inferior, of wools, which about the 1st of September were selling at 28 to 30 cents, now command 40 cents, and rates are expected to rule high for some time, as it will require from six to twelve months to properly replenish the market with stock.

The Blackbird Nuisance.—Blackbirds swarm in such numbers all along the Mokelumne river, California, as to amount to a vexatious nuisance to the farmers. They cover all the fences, fill every tree and bush, and actually darken the air in every direction. Cornfields are robbed by wholesale, and the fruit in the orchards is ruined by their industrious thievery. Many farmers complain of having lost their entire crop of corn in this way. Shooting appears neither to thin them out or scare them away. They breed in the tule lands, and are constantly increasing in numbers, as long as the supply of food is furnished them. Their flesh, at this season of the year, is fat and juicy, and the only wonder is that so few of them find their way into our restaurants.

Grain Supplies.—The probable extent of the demand for breadstuffs from Europe for the coming year may be seen from a few facts. It is ascertained that the crops upon which one hundred and fifty millions of people rely for breadstuffs and other vegetable food are deficient. The grain-growing population of this country, or in the loyal states, does not exceed ten millions. It is to the crops of these ten millions that Europe now looks to make good the deficiencies to her one hundred and fifty millions. The deficiencies need be but very small to require all that ten millions can spare.

Star of Empire.—Leutze, the painter, is the recipient of a rare bit of good fortune in a $20,000 commission from government. He is to paint the ceiling of the corridor of the Capitol ; the subject to be, "Westward the Star of Empire takes its Way."

[We find the above paragraph in an exchange. The artist has, no doubt, a good job on hand, and we presume he will do the work well; but it strikes us that the $20,000 expended to show how the Star of Empire takes its way westward might be better expended in helping on that star southward, where empire don't seem to be making its way just now very rapidly.—Eds.

The impenetrability of the rhinoceros's hide is stated by recent English hunters to be a fable, which arose solely from the fact that walking sticks and whipstocks as hard as horn are prepared from it by a tedious process among the natives of countries which the animal inhabits. A common buckshot will in reality go through the hide with perfect ease. The same invulnerability has been asserted of the alligator, and it has been disproved by killing the monster with a charge of bird shot fired into his right side, through the heart. The eye and the vent are always mentioned as his only vulnerable spots.

The experiment of cultivating the "weed" has been commenced on the Mokelumne river, California. It has grown splendidly and competent judges pronounce it superior to the tobacco grown in Virginia, Kentucky or Missouri.

A steam biscuit bakery has been put in operation at Honolulu, Sandwich Islands. The machinery was imported from San Francisco.

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THE "LONDON ENGINEER" AGAIN ON PATENTS.

From a long article in *The Engineer*, in reply to Sir William Armstrong's proposition to abolish the patent laws, we take the following forcible extract :

But let us take a broader argument. Sir William does not deny or underrate the absolute value of inventions to the public. The *Times*, too, goes so far as to trace the power of Great Britain to the genius of her inventors. The public, therefore, cannot afford to do without inventions. They must acquire them, and will have them on some terms or other, and there are five modes in which we may conceive them to be had. The first is, for each individual to invent for himself. This would be an excellent plan if it were practicable, but invention, fortunately or unfortunately, happens to be a special faculty given to but few men. The second is to force the minority of inventors to give up their ideas to the majority. This plan might be practicable if there were sufficient resources in the Spanish inquisition to carry it out. But it is not safe to count on the extractions of inventions by intimidation or torture. The third is to steal the inventions. To this mode, which we understand Sir William Armstrong to advocate, the objectionsare that it would be often inconvenient, generally tardy, and that the thieves would be often disposed to keep their plunder to themselves instead of making it public. The fourth mode is in the voluntary publications of inventions by their authors. Here we can perceive no motive on the part of the inventor for doing so—*cui bono?* He may be anxious to advertise the capabilities of his invention, but why is he likely to publish its details and *modus operandi?* Even were he to do so after making a fortune, or, still less, a competency from working his invention in secret, his final publication would be late, and the public would, for a greater or less number of years, have been kept out of what they ought to have been enjoying. It may be perfectly true, as Sir William has said on two occasions, that there are often two or more claimants for the same idea, but this is where the idea and its importance are rebognized, and it does not follow that, from mere pride, inventors would voluntarily throw open their ideas where there was no chance of reward. How many inventors now publish their ideas before they have at least obtained provisional protection? The last of the five modes by which an invention may be acquired is by making terms for it, offering either a grant of public money or a patent. The patent being the preferable mode of payment, it would even then be better in most cases that it were made perpetual, like the title-deed of an estate, rather than that the public were deprived of the invention ; but in view of the uncertainties of the case, inventors are willing to accept a limited monopoly. In this country this is 14 years, in France 15, and in the United States, in consideration of the abolition of the right of applying for renewal, 17 years have been lately made the term of a patent. Sir William proposes, now, to do away with patents, which correspond to the fifth mode of obtaining inventions for the public, and thus to fall back upon the chance of epidemic invention, or upon force or theft, or upon the chance of voluntary disclosure, against all of which there are grave objections where there are either not impossibilities or improbabilities in the way of their being made to answer. We suppose he inclines either to the second or third mode, or both, inasmuch as he says that primary inventions ought to be common property. For, although the same might be said of land or gold, saying they ought to be common property does not make them so, and the declaration is a direct suggestion, therefore, of either force or theft.

On the 21st of September last, the ship *Ambercask* sailed from San Francisco for Australia, carrying 35,000 sacks of wheat 115 boxes of silver ore and 13 cases of California wine. A large and profitable commerce is now springing up between California and Australia.

The whole of the land in the neighborhood of Conception Bay, Newfoundland, is gradually rising, and several of the harbors on the coast, at no very distant day will become unnavigable.

The iron columns used in the construction of the fire-proof warehouses in Liverpool are all hollow and filled in the inside with fire-proof concrete.

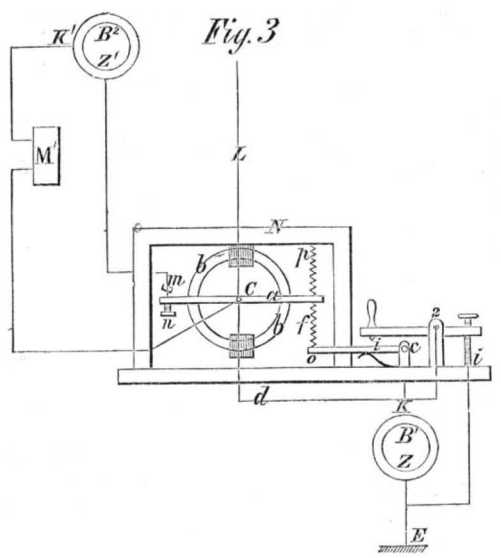
NEW METHOD OF TRANSMITTING SIMULTANEOUSLY TWO DISPATCHES ON ONE WIRE.

[Translated from the Journal of the Austrian Telegraph Association.]

(Continued from page 213.)

If two dispatches are to be sent on the same wire in opposite directions, the same four variations previously pointed out, will occur with the only difference, that in this case at each of the two stations signals must be transmitted and recorded simultaneously. The two recording instruments remain always inserted in the circuit of the line wire, but this insertion must be so made that the current produced on either station does not affect the recording instrument on the other, without however producing any effect on the recording instrument at the first station. This object is obtained by the two opposing currents together with a spring.

Fig. 3



The arrangement of the several instruments being the same at either station, is shown in the accompanying diagram. The relay which actuates the recording instrument is inclosed in the case, N, and it resembles the indicator of Bain. The two semicircular permanent steel magnets, *b*, are placed in a vertical position, being secured to the metal lever, *a*, and revolving with the same around the horizontal axle, C, between the two points of contact, *m* and *n*. On the rear end of the lever, *a*, two springs, *p* and *f*, are attached, and when in its normal position the lever, *a*, is kept in contact with the point, *n*, by the action of the spring, *p*. One end of the helices is connected with the line wire, L, and the other end with the fulcrum, 2, of the key. The contact point, *i*, of the key and the zinc pole, Z, of the main battery, B′, are connected with the earth, E. The copper pole of this battery, on the other hand, connects with the lever, *c i o*, which forms the working contact of the key and to which, in the interior of the case, N, the spiral spring, *f*, is secured. The fulcrum, C, of the armature, *a*, connects with the helix of the recording instrument, M′, and by this with the copper pole, K′, of the local battery, B2, the zinc pole of which connects with the point, *m*.

The operation is as follows :—

1st. No signal given ; neither of the keys is depressed ; there is no current and neither of the recording instruments operates.

2d. One station gives a signal ; its key is depressed on lever, *c i o*, and the current passes from K, in B′, through *i c* and *d*, and through the helices to the line wire ; the armature, *a*, is firmly retained in contact with the point, *n*, by the action of the relay, which is sufficiently powerful to retain it notwithstanding the power of the spring, *f*, is slightly increased by depressing the key. At the transmitting station the local battery is not closed and the recording instrument at this station is at rest ; on the other station the signal is recorded, as will be presently explained.

3d. One station receives a signal ; the current which passes from the transmitting station into the line wire, L, enters the helices of the relay, and after passing through them in a direction opposite to that described under 2d, goes through *d* 2 and *i* of the key at the recording station (which is not depressed) to the earth, E. The current causes the armature, *a*, to turn to the point, *m*, the local battery, B2, is closed and the signal is recorded by the instrument, M′.

4th. Both stations transmit a signal ; the keys in both stations are depressed, and both main batteries send currents into the line wire. At either station, however, the current emanating from the same acts as described under 2d, its effect being nearly balanced by the spring, *f*, and the current from the other station passing from *d* through 2 *i c* K and Z of the line battery, B′, to the earth, E, causes the armature, *a*, to move toward the point, *m ;* the local batteries at both stations are closed, and both recording instruments come into action.

It will not be very difficult for practical telegraph operators to apply these improvements to American lines which are worked by continuous currents.

How an Army Moves.

There are a great many things besides men and guns essential to an army ; and the commander, about to lead an army into a hostile country, first sees that the commissariat is well provided with provisions, that there are ample means of transportation, and that there is a reserve of ammunition and clothing, and a good supply of hospital stores and medicines. All the preliminary arrangements for the march having been carefully made, the "order of march" is communicated to the several commanding officers of divisions, brigades and regiments, but not published in orders. The troops are distributed according to the character of the country.

In a very open country a large portion of cavalry would be at the head of the column ; but generally it is distributed throughout the line. The artillery should be in the rear of the first foot regiment. An advance of rear guard of mounted troops—one or two companies—should be detailed each day, and the regiment that has the right of the line one day should be next day in the rear. In a woody or mountainous country, detachments of flankers and skirmishes are thrown out to the right and left of the column, at a distance of one to two hundred paces, to keep a sharp lookout, and prevent any such disastrous and gratuitous experience as those painfully and recently familiar to us in connection with the ambuscade on the road to Vienna.

The column having been formed at half or quarter distance, and the baggage train assembled in the rear, protected by a guard selected from each regiment for its own baggage, the column is put in motion, and the march commences with the same regularity as would be observed by a regiment moving in or out of a garrison town, the band playing, the light infantry with arms sloped and those of the riflemen slung over the shoulder, the officers with swords drawn, exact wheeling distance preserved, and perfect silence observed.

After having proceeded a short distance in this manner, the word of command, "route step," is given by the general at the head of the leading battalion, and passed quickly on to the rear. The captains, instead of continuing at the head of their companies, draw back to the rear of them, that they may see any men of their respective companies who attempt to quit the ranks without leave. The soldiers then march and carry their arms in any manner convenient to them, conversation and smoking being ordinarily allowed.

Smelling Powder.—It seems to be understood that Gen. McClellan is pursuing the plan of meeting the rebels with small bodies of troops in frequent reconnoissances and foraging expeditions for the sake of getting his men accustomed to being under fire. They are taking their turns in being shot at, as a part of their elementary discipline. "All the drilling in the world will not make them soldiers without the frequent 'smell of powder,' and this they are now enjoying every few days."

Blistered Hands and Feet.—As a remedy against blistering of hands in rowing, or fishing, &c., or of feet in walking, the quickest is, lighting a tallow candle, and letting the tallow drop into cold water (to purify it, it is said from salt,) then rubbing the tallow to the hands or feet, mixed with brandy or any other strong spirits. For mere tenderness nothing is better than the above, or vinegar a little diluted with water. This, for the most part is a remedy of the Col. Thornton of pedestrian celebrity.

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Correspondence

The Blessings of Secession.

MESSRS. EDITORS :—I noticed in your issue of the 28th ult. the publication of my former letter to you, which I did not expect to see in print. Had I thought of its possible publication I would have given you some additional particulars. Although born in Georgia I have resided in Montgomery, Ala., most of the time since 1844, where I received your useful paper.

To give you a more clear idea of how things are going on in Secessiondom, I present the following facts :—Rio coffee is selling at 50 cents per lb., sugar $1 for 9 lbs., butter 30 to 50 cents per lb., rib sides 25 cents per lb., eggs 30 cents per dozen, molasses 60 cents per gallon, flour $4.50 to $5 per hundred ; corn meal $1.10 and $1.20 per sack ; Irish potatoes (very scarce) $8 per barrel, sweet potatoes, $1.25 per bushel, —have been much higher; salt $4 per sack, chickens 30 to 50 cents each, beef 10 to 20 cents, turkeys $2.50 to $3.50 per pair.

The women have been called on to knit stockings for the soldiers, to spin, weave and make clothes, give up all their blankets and supply their place with comfortables for home use. The planter is required to supply the sinews of war by subscribing a part or all of his crop of cotton to the so-called Confederacy, at the same time he is warned by the factors not to move the cotton from his plantation as it would be liable to bring trouble to the cities wherein it is stored. Goods of every description amount to remnants, and many things, are very scarce or entirely gone, especially those in greatest demand, and must continue to be so, now that the last gap has been closed. I cannot see how the *rotten* concern can breathe much longer ; all that is necessary to do is to hold on to all we have, and keep tightening every screw down, down—be sure not to turn the wrong way—and this curse of all curses must give up the ghost, as it should do, and beg pardon, for it is the " young sauce-box " on the apple tree. This secession *fowl* is a thing that must be taken on the wing. Those who wait for it to stop, and suppose they can get a chance with a good rest, will find themselves entirely too slow. It is constantly on the alert ; like a bad monkey, out of one mischief into another. The thing is roped and blockaded, and I trust will not be allowed to do much more harm. I look upon it as a great assassin, a formidable mob, the iron-heeled monster and oppressor, the serpent in the garden. If all the abominable and wicked cruelties that are practiced on the people could be made public, the world would be more amazed than ever, and the bitter taunts of the British press as applied to the North would cease. As, however, good sometimes comes out of evil, I think this will wind up like pure gold tried in the crucible, and we should learn the more highly to appreciate our blessed Union. A neighbor and myself exchanged our real estate for property in Chicago. I got off a few days before he was ready to start, and, thank heaven ! made my escape. What has become of him I know not, and would not be surprise at any bad consequence befalling him.

Kentucky is all right and getting better every day. Her people are not only doing their part, but, God bless them ! like legions of angels they come to her assistance from all quarters. A. W. T.

Louisville, Ky., Oct. 4, 1861.

Glass for Leyden Jars.

MESSRS. EDITORS :—In a late number of your SCIENTIFIC JOURNAL there was a remark on the difficulty of procuring the right kind of glass for making Leyden jars. If a metal is used in manufacturing the glass the latter will of course be a conductor, and consequently useless for electrical purposes. There is a simple method, however, of testing the glass before going to the expense and trouble of coating with tinfoil.

Fill the jar about two-thirds full of water, and place it in a bucket containing enough water to make that on the inside and outside of the jar of nearly the same hight. Connect the inside of the jar by a chain to the prime conductor of an electrical machine and charge it. Then apply the discharger (one extremity to the outside of the bucket, and the other to the chain), and if no discharge takes place the glass is a conductor, and is useless for forming a battery.

D. S. M.

Peoria, Ill., Sept. 26th, 1861.

Important Question about the use of Patent Inventions.

MESSRS. EDITORS :—I wish to consult you in regard to a patented article which I have purchased (or rather which is said to be patented). I bought a set of buggy wheels in Rochester, expecting they were a patent wheel, but when I got them home and examined them I found no marks on them to indicate them as such, and have put them into my buggy and used them. There is a man here who says he owns the right of this town for the use of those wheels (he does not make the wheels but buys them at the same place I bought mine) ; he claims $5 of me for the right to use them. Now, I wish to know if I am liable to pay this demand, and if so, why I would not be liable to pay similar demands in every town I drove through, if the man who owns the right of said towns should demand it. Some who pretend to know, say that that would be the case. And further, I wish to know if the maker of the wheels is not liable for not marking them. Yours respectfully,

J. B. W.

Lakeville, N. Y., September, 1861.

[The question propounded by our correspondent is an unsettled one, and of late has engaged our careful attention. We find that eminent patent attorneys in this city take opposite views of this question, and we understand that it will soon be brought to the notice of the Federal courts. From all the light we can gather upon the subject, we incline to the opinion that the purchaser of all property has the right to use it according to his own pleasure, unless prohibited by some positive law. The patent acts give exclusive right to the patentee " to make, use and vend to others to be used," the patented article, but it gives a patentee or any assignee under him, no right to restrict or limit the " *use* " when he " vends " the article. The sale must be full and free, like all other sales. The patentee has no power under the law to dictate when, where or how the thing shall be used. Hence, though an assignee, limited to a particular town or district, can only " make or vend " in that town or district, there is no provision in the law which confines the use to that town or district. Such an intention in the Legislature could only be expressed by conferring the exclusive right " to make, use or vend to others to be used " *in such place or places as the patentee would prescribe.* Our laws contain no such provision, and we are inclined to think that Congress had no such intention when the statute was framed.

Theophilus Parsons, Esq., in his Treatise on Patents, published in Appleton's new " Encyclopedia " uses the following language on this point :—" A curious question has arisen as to the interference of local rights under a patent. Thus, a man has a right for the county of Hamilton to make and sell certain patent bedsteads ; another man has a similar right for the adjoining county of Dearborn. The first man sells a large quantity to a purchaser, who takes them into Dearborn and undersells the person having the right for that county. It seems now to be determined that this is not an infringement or unlawful interference."

The provision of the Patent Act of Aug. 29, 1842, making the patentee liable to a fine who does not mark his article " patented " with the date, has been repealed. The provision of the law on this subject now is, that if the patentee fails to label or stamp the articles so patented, no damage shall be recovered by the plaintiff, except on proof that the defendant was duly notified of the infringement, and continued after such notice to make or vend the article patented.

Sighting Rifles.

MESSRS. EDITORS :—Rifle shooting is just now an interesting subject. I have never yet known a rifle fresh from a government armory that was correctly sighted. I have rarely, if ever, seen a new rifle that would, without alteration, make a true " line shot." Officers of our army who expect good shooting from their men should furnish them, as a regular duty, with the means and opportunity to sight their guns correctly, and they should do this independently of ordinary target shooting exercises, each soldier retaining his own particular gun Sporting rifles also, are rarely properly sighted when they leave the maker's hand ; nothing short of practice with each gun can accomplish this.

To be a good rifle shooter, one should have a pretty correct idea of the principles which regulate the flight of a bullet. Thus, a bullet fired from a level gun at an elevation of sixteen feet will, with any charge of powder, strike the ground in one second of time, and at a shorter or longer distance in proportion to the force of the charge. The sights should therefore, be so arranged as to overcome, by inclination of the muzzle with a known charge of powder, the sixteen feet gravitation at the point where the ball would otherwise strike the ground. For two seconds the inclination of the muzzle must be tripled and so on. And as the curve described by the bullet is not regular but parabolic, the elevation of the sight will be irregularly increased, but what particularly must be accomplished is a " line shot." There is necessarily so much to be left to estimate in calculating distance that practice only can overcome the difficulty with the ordinary use of the soldier's rifle. Thus, for example, at an angle of 45° up or down, one half of the gravitating force of the ball is overcome, and consequently a calculation must be made that eight feet are to be overcome, instead of sixteen in the first second, or the gun must be pointed precisely eight feet under the object, and so varied for any differing distance. An angle of 25° up or down, would probably require a shot to be made three and a half feet below the object. If proof were needed of the truth of this proposition it is afforded in nearly all the practice during this war, the firing of both artillery and rifles having been nearly always over. R. H. A.

Baltimore, Md., Oct. 1861.

California Quicksilver.

Without quicksilver very little gold would be obtained from the mines in any country. This metal is a most subtle searcher after gold. Quartz, in which not a trace of gold could be observed by the naked eye, has been made to yield at the rate of two hundred dollars to the tun of the genuine metal, and all by the quicksilver " licking it up " and forming it into a pasty mass. Quicksilver is to the miner what steam is to the engineer. California possesses extensive quicksilver mines, from which she not only supplies her own miners, but furnishes the liquid metal in large quantities for the miners of many other countries. The exports of quicksilver from San Francisco, since Jan. 1st up to Sept. 1st, have been as follow :—

China	Flasks 8,674	Peru	Flasks 1,258
Mexico	" 7,837	England	" 1,000
Australia	" 1,050	New York	" 625
Chile	" 1,009	Vancouver	" 99
Total			21,552

The invoiced value of these exports was $691,088.

The Chinese use mercury for making that beautiful pigment vermilion.

The English Covernment Building Iron-Plated Wooden Ships.

At a recent meeting of the British Association for the Advancement of Science, Mr. E. J. Reed read a paper " On the Iron-cased Ships of the British Admiralty," from which we take the following extract :—

I now come to notice a very different class of vessel, in which the hull is to be formed mainly of timber, the armor plating brought upon the ordinary outside planking. The *Royal Alfred, Royal Oak, Caledonia, Ocean* and *Triumph* are to be of this class. Their dimensions are to be—length, 273 feet; breadth, 58 feet 6 inches ; depth in hold, 19 feet 10 inches; mean draught of water, 25 feet 9 inches ; and hight of port, 7 feet. They are to be of 4,045 tuns burden, and to have a displacement of 6,839 tuns. They are to be fitted with engines of 1,000-horse power. They are being framed with timber originally designed for wooden line-of-battle ships, but are to be 18 feet longer than those ships were to be. They will form a class of vessels intermediate between the *Hector* and the *Warrior* classes, but unlike both of them, will be plated with armor from end to end. They will be without knees of the head, and with upright round sterns, and will, therefore look very nearly as ugly as *La Gloire*, although in other respects, much superior vessels, being 21 feet 6 inches longer, 3 feet 5 inches broader, and of less draught of water. They will also be quite equal to her in speed. With respect to the armaments of the new classes nothing has yet been finally decided.

LAC spirit varnish is sometimes employed for *papier mache* and japanned work. It should always be put on in a warm situation, or it will dry cloudy and without brilliancy.

A SOLUTION of strong isinglass and honey makes a good water varnish for covering water colors.

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On the Effect of Great Pressures Combined with Cold on the Six Non-Condensible Gases.

Dr. Andrews recently read a paper on this subject before the British Association for the Advancement of Science. In this communication the author gave an account of some results already obtained in a research with which he is still occupied on the changes of physical state which occur when the non-condensible gases are exposed to the combined action of great pressures and low temperatures. The gases, when compressed, were always obtained in the capillary end of thick glass tubes, so that any change they might undergo could be observed. In his earlier experiments the author employed the elastic force of the gases evolved in the electrolysis of water as the compressing agent, and in this way he actually succeeded in reducing oxygen gas to 1-300th of its volume at the ordinary pressure of the atmosphere. He afterward succeeded in effecting the same object by mechanical means, and exhibited to the Section an apparatus by means of which he had been able to apply pressures, which were only limited by the capability of the capillary glass tubes to resist them ; and while thus compressed the gases were exposed to the cold attained by the carbonic acid and ether bath. Atmospheric air was compressed by pressure alone to 1-371 of its original volume, and by the united action of pressure and a cold of 106° Fah. to 1-675th ; in which state its density was little inferior to that of water. Oxygen gas was reduced by pressure to 1-324th of its volume, and by pressure and cold to 1-554th ; hydrogen by the action of cold and pressure to 1-500th ; carbonic oxyd by pressure to 1-278th, by pressure and cold to 1-278th ; nitric oxyd, by pressure to 1-310th, by pressure and a cold of 160° Fah. to 1-680th. None of the gases exhibited any appearance of liquefaction, even in these high states of condensation. The amount of contraction was nearly proportional to the force employed, till the gases were reduced to from about 1-300th to 1-350th of their volume ; but, beyond that point, they underwent little further diminution of volume from increase of pressure. Hydrogen and carbonic oxyd appear to resist the action of pressure better than oxygen or nitric oxyd.

Free Drawing Lessons.

The facilites for instruction in the art of drawing both for ornamental and scientific purposes are probably greater in this city than in any other in the world. Notwithstanding the drain on our material and means, caused by the war, evening lessons in all branches of drawing are commenced this week in the Cooper Union Building at the head of the Bowery, and at the Mechanics' Society's Building, 32 Crosby street, and in both the select schools, the instruction is free. We have not received full information concerning the Cooper School, but it may be important to many to know that in the other, the Mechanics' Society's School, new pupils will be received for some time to come. The architectural drawing lessons are given on Tuesday and Friday evenings, and the mechanical drawing lessons are on Monday and Wednesday evenings. Simultaneously with the latter class there is a large and enthusiastic class in free hand drawing, or drawing without instruments, adapted to aid stonecutters, sign painters and ornamentists generally. We exhort all apprentices and young mechanics of every trade in this city to attend these drawing classes. They should avail themselves of these inestimable privileges to acquire skill in drafting, without a practical knowledge of which they can never rise to first positions in their respective callings.

A Large Contract.—Stephen Cromwell, of Camden, Ohio, has made a contract by which he is to furnish one hundred and fifty thousand cords of wood for the Ohio Central Railroad Company. The magnitude of this contract can be understood only when we take into consideration the fact that it makes a pile four feet high and not less than two hundred and fifty-seven miles long, and requires the delivery of nearly fifty cords a day (Sundays excepted) for ten years.

Mr. John Poad Drake, naval architect in England, claims, through the columns of the London *Mechanics' Magazine*, to be the inventor of iron-plated frigates. Between 1832 and 1840 he designed a number of war vessels with the engine rooms protected from shot by thick plates of metal.

On the Natural Dissemination of Gold.

Mr. Eckfeldt, the principal assayer of the United States Mint at Philadelphia, has lately made several interesting examinations tending to show the very wide distribution of gold. Passing over the evidence respecting its presence in various galenas, in metallic lead, copper, silver, antimony, &c., we recite the following, perhaps the most curious result of all:—

Underneath the paved city of Philadelphia there lies a deposit of clay, whose area, by a probable estimate, would measure over three miles square, enabling us to figure out the convenient sum of ten square miles. The average depth is believed to be not less than fifteen feet. The inquiry was started whether gold was diffused in this earthy bed. From a central locality, which might afford a fair assay for the whole, the cellar of the new market house in Market street, near Eleventh street, we dug out some of the clay at a depth of fourteen feet, where it could not have been an artificial deposit. The weight of 130 grammes was dried and duly treated, and yielded one-eighth of a milligramme of gold ; a very decided quantity on a fine assay balance.

It was afterward ascertained that the clay in its natural moisture loses about fifteen per cent by drying. So that, as it lies in the ground, the clay contains one part gold in 1,224,000.

This experiment was repeated upon clay taken from a brickyard in the suburbs of the city, with nearly the same result.

In order to calculate with some accuracy the value of this body of wealth, we cut out blocks of the clay, and found that, on an average, a cubic foot, as it lies in the ground, weighs 120 pounds, as near as may be ; making the specific gravity 1.92. The assay gives seven-tenths of a grain, say three cents' worth of gold to the cubic foot. Assuming the data already given, we get 4,180 millions of cubic feet of clay under our streets and houses, in which securely lies 126 millions of dollars. And if, as is pretty certain, the corporate limits of the city would afford eight times this bulk of clay, we have more gold than has yet been brought, according to the statistics, from California and Australia.

It is also apparent that every time a cartload of clay is hauled out of a cellar, enough gold goes with it to pay for the carting. And if the bricks which front our houses could have brought to their surface, in the form of gold leaf, the amount of gold which they contain, we should have the glittering show of two square inches on every brick.

Float Land.

The Stockton (California) *Republican* remarks :—"We presume that few persons are aware that in this agricultural district there exist quite large tracts of land that actually float upon deep water. The soil of them is some two or three feet in depth, and a twenty-foot pole forced through it finds no bottom below, as there is usually a lake of great depth beneath it. This we should say is at high tide, for the lands rise and fall with it. Some of the tracts are very superior grazing land, and large quantities of hay are cut upon it, persons going with their carts, animals and machinery upon the tracts. At high water the land bends up ahead, like a small hill, when a heavy team passes over it, which embarrasses the cattle very much. They are generally driven over it at low tide. The bending is like that of ice in some stages, and there are air holes in the land. Persons navigating sloughs are sometimes compelled to pry an acre or two one side or the other, to afford room for their vessels to pass. These singular formations originate, probably, from floating tule and other drift stuffs which have collected and by some means have sunk under the water sufficiently to receive the sediment left by floods for years. The owners of these lands intend, by artificial means, to double the depth of the soil on their islands, considering them a valuable part of their possessions. We have the above from a farmer on the San Joaquin, upon whose word we can depend. Were we the owner of one of these floating pastures, we should wish to anchor it very stoutly, or cultivate trees to which to tie it at night."

In France about 32 millions of capsules, made of a composition of tin and lead, are made annually by machinery. They are chiefly employed, we believe, for wine bottles.

New Gun Rifling Machines.

At Remington's armory, Illion, N. Y., there is a small machine constructed by Mr. Wm. H. Elliott, which is capable of rifling one thousand pistol barrels per day in the most perfect manner. Mr. Elliott is now building for the same company a large machine for army rifles. These improved machines are vertical and quite superior in their operation and construction to the common horizontal rifling machines.

In addition to their old armory—which is quite large— Messrs. Remington are now building a large shop for making government rifles. In the manufacture of barrels for rifles they have long had an unrivaled reputation.

Population of the Globe.—A Professor of the Berlin University has been making curious researches respecting the population of the globe. The following is the result : "Population of Europe, 272,000,000 ; of Asia, 720,000,000 ; of America, 200,000,000 ; of Africa, 89,000,000 ; of Australia, 2,000,000. Total population of the globe, 1,283,000,000. The average number of deaths per annum, in certain places where records are kept, is about one to every forty inhabitants. At the present time the number of deaths in a year would be about 32,000,000, which is more than the entire present population of the United States. At this rate the average number of deaths per day is about 87,761, the average per hour 3,653, the average per minute 61. Thus, at least, every second a human life is ended. As the births considerably exceed the deaths, there are probably 70 or 80 human beings born per minute."

Our Natural Products.—During the past week there were received in this city 121,000 barrels of flour, 764,000 bushels of wheat, 795,000 bushels of corn, 57,000 bushels of barley and malt, 4,100 bales of wool, 4,600 barrels of highwines, 42,000 sides of leather. The clearances for the past week to foreign ports are valued at more than three million dollars, including 76,000 barrels of flour, 934,000 bushels of wheat, 407,000 bushels of corn, 51,000 bushels of rye, 3,454 hogsheads, cases, &c., of tobacco, about two hundred thousand gallons of oil, three million pounds of lard, butter and cheese. Nearly all the wheat goes to France, and two-thirds to Havre ; nearly one half the flour also goes to Havre.

The American Arctic Expedition.—Amid our national troubles the public seem to have forgotten the expedition of Dr. Hays and his companions to the Arctic regions, in search of more definite information regarding the open polar sea of Dr. Kane. Since the fall of 1860, when the explorers were at Uppernavic, nothing has been heard of them. In the dismal regions of perpetual snow these heroic Americans are struggling to extend geographical science amid the icebergs of the north, altogether unconscious of the more painful struggles between man and man now taking place in their native land.

Lumber Business.—The Albany (N. Y.) lumber trade has been very poor this season, in comparison with that of previous years. Up to the 1st of September last, the quantity of boards and scantling that arrived in Albany was 120,301,664 feet ; shingles, 27,245 M.; staves, 108,937,160 lbs., against 239,146,600 feet, 26,520 M., 108,870,777 lbs., in 1860. There has been a slight increase in the staves, which shows, unfortunately, that the beer and whisky business has been prosperous ; while the great decrease of lumber shows the building business to have been greatly depressed.

An immese breakwater has just been completed at Portland, on the southern coast of England. The whole work was done by convict labor. It is described as a mole of loose stones, three hundred feet in breadth at the base, one hundred feet in hight, and a mile and a half in length. It has cost, in round numbers, £900,000, twice the estimated expense. At the end of the mole a first-class fortress will be built.

Patent Sale.

The right for the Gas Carbonizer, illustrated on the first page, we are informed by the inventor, has been sold for the city of Philadelphia for ten thousand dollars.

A single incendiary shell lately fired at an old hulk in Toulon harbor, France, made an opening of about ten square feet in her hull.

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One of the Great English Frigates to be Built in a Dry Dock.

The Liverpool *Albion* says :—"We stated last week that arrangements were not finally concluded as to Messrs. John Laird, Sons & Co., building one of the new iron-cased frigates, of about 7,000 tuns measurement. Since that time we understand the contract has been settled, and the work will be proceeded with immediately. The *Black Prince, Defense, Warrior* and other vessels of this class, already constructed, have been built on the slipway, and launched in the usual manner, which in vessels of this size involves considerable risk, and the necessity of launching before the armor plates are all complete. As Messrs. John Laird, Sons & Co. possess the only private graving docks in the country capable of receiving vessels of this large class and great draft of water, it is, we hear, their intention to build the new ship in one of them, roofing it over, and fitting the sheds with traveling cranes, and other conveniences, so that the ship may be entirely finished under cover, and floated out of dock ready for sea; and also with the engines and boilers fitted on board, in case the Admiralty should decide to have them put in here, instead of sending her to a dock yard for that purpose. By these means the work can be more efficiently completed, and the men employed will have the advantage of working under cover. It is stated that the vessel will require two years to build, employing during that period 1,000 to 1,500 workmen—an immense advantage to the town of Birkenhead, which will gain largely by an increased expenditure among the tradesmen and artisans of the township.

Tempering and Hardening the Teeth of Saws.

The following is the substance of a patent granted to N. Wharton and published in the first volume of Canadian Patent Reports lately issued. The process of tempering saw teeth is so different from the usual mode pursued, that it will be read with interest by a great number of our readers.

A sheet-iron box, 7 feet in length, 12 inches in depth, and six inches in width, to contain charcoal, is made with an opening at the bottom to contain air. A plate or shelf of iron, seven inches wide, projects horizontally from the box whereupon to lay the saw, having an opening to admit the teeth to be heated. On the top of the iron box is a range of funnels, or chimneys, having an air valve or damper in each to regulate the heat; there is also a water trough the length of the saw, having an iron bolt across within both ends, to be filled with water, oil or other fluid, to the proper hight required to temper the points of the teeth, but not to harden those parts to be bent by the saw set. After hardening the points the temper will require to be drawn or brought out by the application of a hot-iron bar, or ignited oil, together with a wet sponge until they will admit the action of a file.

Colored Spectacles.

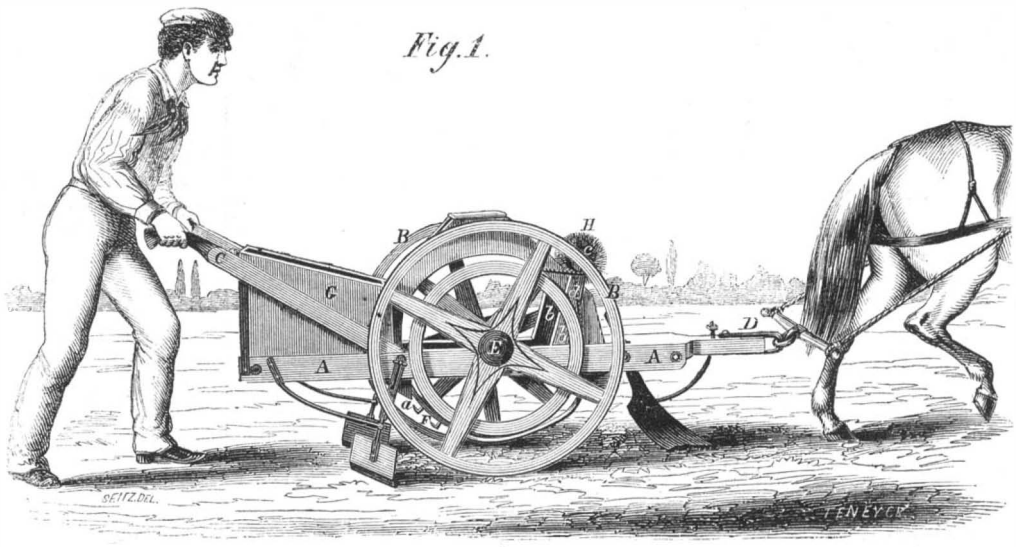
Many persons who have weak eyes wear colored spectacles when they are positively injurious. On no account should colored glasses be worn on a dull day, in the dusk of the evening or, as a general rule, in mild artificial light. The reasons for such caution in the use of glasses are, that the power of the eyes becomes impaired to endure strong light by accustoming them to the impressions of feeble illuminations.

Some persons who have delicate organs may occasionally employ spectacles of lightly tinted glass for reading and writing, but they should be avoided if possible. Colored glasses are useful to protect the eye from the brilliant reflection of snow and the bright rays of the oxyhydrogen and electric light, and for this purpose they should be a deep green. Persons recovering from inflammation of the eyes should also use such glasses, but they ought to be laid aside as soon as possible. The eye should be accustomed to endure strong sunlight when not reflected from dazzing surfaces, such as bodies of water, white sand and snow.

Improved Potato Planter.

The implement here illustrated is intended for planting potatoes in drills. It was used in several places last spring and the crops from the seed planted by it show that it operates in the most successful manner. It is very simple, durable, and easy to operate; and can be readily adjusted to plant the seed any distance apart in the row that may be desired.

Fig. 1.



KERSEYS' IMPROVED POTATO PLANTER.

Fig. 1 is a perspective view of the machine in operation, and Fig. 2 a vertical longitudinal section. The potatoes, either whole or cut in pieces, are placed in the hopper, G, and as the disk, F, revolves upon the axle, E, the hooks, *a a*, which are inserted into the periphery of the disk, F, are carried upward through the front end of the hopper, each hook piercing a potato, and carrying it over the wheel to its front side. Here the potato is swept off the hook by the rapidly revolving brush, H, and falls down into the furrow. The furrow may either be opened beforehand by a plow, or it may be formed by the coulters shown in

Fig. 2.

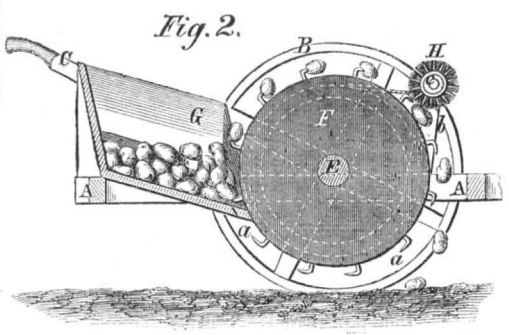


Fig. 1; scrapers following after the wheel to cover the seed, and completing the operation at a single passage over the ground. The hooks, *a a*, are screwed into the disk, F, and their distances apart may be varied at pleasure, to adjust the distance apart of the seed in the row.

The patent for this inveniton was granted through the Scientific American Patent Agency, Sept. 25, 1860, and further information in relation to it may be obtained by addressing the inventors, G. W. & J. J. Kersey, at Beartown, Pa.

We have recently examined some paper which possesses valuable qualities for keeping rifles clean when it is used for cartridges. It is prepared with acids and is partially converted into the condition of gun cotton; then it is treated with a solution of the chlorate of potash and becomes perfectly combustible. The cartridges for Colt's revolvers are now made of this paper; the flash of the percussion cap instantly ignites it, when it burns without leaving any solid residue, and at the same time it increases the elastic force of the ordinary charge of powder.

A steam fire engine, built in New York, is now in Hayre, and the builder, Mr. Lee, has arrived in London for the purpose of introducing similar engines there.

Emery.

This substance is found in shapeless granular masses, at the base of mountains, in several of the islands of the Grecian Archipelago. The chief supply is obtained from the island of Naxos, at Cape Emeri, whence its name. A considerable quantity, however, is procured from the neighborhood of Smyrna, the East Indies, and in some mines in Saxony. In Jersey and our own country small quantities of it are occasionally found. Emery is a greyish black, or brown, opaque mineral, with a glistening luster and an uneven fracture, and is distinguished by its extreme hardness, inferior only to that of the diamond. In order to prepare emery for use, it is first crushed under heavy iron stampers, then ground in steel mills, and mixed with water; the coarser particles having been allowed to subside, the water is poured off with the finer portions; these after a time sink, and are collected for use. Sometimes the emery is burnt or calcined for the purpose of enabling it to be reduced to powder with less labor. The use of emery depends upon its extreme hardness, which enables it, when in a state of fine powder, to be used by lapidaries for grinding and polishing precious stones; by cutlers, in finishing steel instruments; by opticians, for polishing glasses, &c. Sprinkled over paper or stout calico, which has been previously covered with a layer of glue, it forms emery paper or cloth; this is much employed in cleaning iron instruments and articles of domestic use. It has recently been converted into superior polishing wheels by combining it with india-rubber mixtures and vulcanized.

Incendiary Shells.

According to General Konstantinoff, of the Russian service, who very recently published "Lectures on fuses, their history and use, by authority of the Russian Department of War," the most destructive compound for filling these missiles is a solution of phosphorus in bisulphide of carbon. The latter, as soon as it comes in contact with the air, evaporates, leaving the phosphorus in a minute state of division on any surface it happens to fall on, when it immediately takes fire, and does so repeatedly as often as it is extinguished.—*Exchange.*

[This chemical mixture for filling shells was patented in England during the Crimean war, but the English government refused to use it. The Russians have now obtained the secret and will not be so stupidly backward in its employment.—Eds.]

Rubasse.—A beautiful red-colored stone has lately been popular in Paris, and brought high prices to the jewelers. Prof. Schaffgotsch examined a specimen, and found that when placed in ammonia it soon lost its beautiful color, and became a simple piece of rock crystal. It was, indeed, a specimen of quartz, the minute fissures in which had apparently been filled with a solution of carmine.

More Defects of Armstrong Guns.—The *Army and Navy Gazette* states that recent experiments with Armstrong guns and iron shields at Shoeburyness were brought to a sudden stop by "the successive smashing of no less than six vent-pieces in one day." This is a serious matter, and the Gazette says; "It mainly destroys our confidence in the present rifled guns adopted for the use of English artillery. It is clear, as we stand at present, no dependence can be placed on continuous firing from the Armstrong artillery."

Naval.—The new gunboat *Ottawa*, which was built by J. Westervelt, in this city, and the engines at the Novelty Works, was put into commission on Monday, this week. With the *Unadilla* this makes the two first of the twenty-three gunboats that have been placed in service. This is the vessel which was illustrated on page 192, this volume, Scientific American. It is built in the very best manner throughout.

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Scientific American

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY
At No. 37 Park-row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Two Dolla s per annum.—One Dollar in advance, and the remainder in six months.
Single copies of the paper are on sale at the office of publication, and all the periodical stores in the United States and Canada.
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
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VOL. V. NO. 16.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, OCTOBER 19, 1861.

INFORMATION AS TO THE PATENTABLE NOVELTY OF INVENTIONS.

The list of claims published from week to week in these columns, indicate truthfully the extent of business being transacted at the Patent Office.

It will be observed that inventors are far from being dormant, if they are not as numerous and active, as they were a year ago. Since the first of July we have received a great accession to the subscription list of this journal, and for the information of each, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and who contemplate securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. Having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a drawing and description or a model of the invention should accompany the remittance. Address—

MUNN & Co., No. 37 Park-row, New York.

TREATMENT OF SHIP TIMBER—VENTILATION.

The density of timber is a very good index of its strength and durability. Timber varies in its specific gravity according to the nature of the soil upon which it grows and the climate in which it is reared. The most dense timber grows in dry tropical climates. Teak, *lignum vitæ*, ebony and mahogany—the very hardest woods used in the arts—are the products of the tropical regions. Many persons entertain the erroneous notion, that the strongest timber grows in the colder climates. In selecting oak trees for shipbuilding great practical skill is requisite to judge of their age. Those which have attained to their full growth have their heartwood of the same density and strength throughout; those which are overgrown and those which have not come to maturity, are not of uniform density. The age at which an oak attains to maturity is supposed to be from eighty to one hundred years. This depends in a great measure, however, upon the nature of the soil upon which it grows. If it is moist and porous it matures faster, and the timber is inferior in proportion. "Soon ripe, soon rotten," is an old and true adage applied to the vegetable world generally.

One great defect of timber is its liability to rot. The principal expense connected with shipbuilding is not for the purchase of raw materials, but for the shaping, arranging and fitting them together. It is not only very provoking, therefore, but very expensive to witness a noble ship, constructed upon the most approved model, and at great cost, rendered almost useless in a few months by the growth of a fungus in the timbers termed *dry rot*. This has occurred to a great many war ships—the very class which costs most to build. Great attention, therefore, should be directed to the preservation of such vessels from dry rot.

In the late edition of the "Encyclopedia Britannica Mr. Robert Murray treats this subject in a very instructive manner. He states that the various processes for preserving timber by the absorption of metallic salts, have more or less failed in practice, and are now very generally abandoned. Timber prepared with creosote, he states, resists the attack of marine worms and insects, but the strong odor which it imparts to timber, makes it objectionable for ship building. Salt, with which some timber is treated, attracts much moisture, and is destructive to bolts and other iron fastenings. Empyreumatic oils render timber impervious to moisture, and they tend to prevent iron fastenings from rusting, but they are very inflammable and therefore dangerous. In some government dock yards oak timber is submerged in shallow salt water among the mud from ten to twenty years. This treatment preserves it very perfectly from subsequent rot, but it is very expensive.

There are thus serious objections to mostly all the chemical processes which have been proposed and tried for treating ship timber, and Mr. Murray sums up the most practical and best systems in two words, "seasoning" and "ventilation."

The timber must be thoroughly seasoned and dried on shore, and after being made into a ship it must be properly ventilated. The closely packed timbers and the double planking of war vessels render it almost impossible to ventilate their timbers. This is the reason why so many frigates require frequent repairs and renewal of their timbers.

Mr. Murray states that merchant ships built of inferior timber and in a hurried manner by what are called "slop builders" are known to resist the ravages of dry rot much better than the expensively and elaborately constructed ships of her Majesty's dockyards; nay, more, these same ships, even when constructed entirely of green timber will last longer than a government ship built with the best seasoned oak."

This is exceedingly important information. The greater durability of the timber of merchant ships is attributed to the spaces left between the timbers and the planking by which ventilation is promoted. To secure the greater durability of war vessels, it is suggested that spaces be left between the timbers, and that currents of dry air be maintained through these spaces and between the planking. On all wooden steam ships perfect ventilation among the timbers can easily be maintained by a small blower worked by the engine, producing currents. Of course the hull will require to be constructed with united channels between the timbers to secure this object.

The new gunboats which have lately been built for our navy have spaces left between the ribs, thus securing a proper arrangement for the ventilation of their timbers. We have heard complaints made against these vessels to the effect that their hulls were not of sufficient strength, the timbers and planking not being a packed mass. The fact is, the British gunboats that were built hurriedly in the old way for the Crimean war—and which soon became useless from rot—afforded a useful lesson to our naval architects, and they have wisely profited by it.

CANNON AND FROST.

Artillery and cool weather, we suppose, are the two things that the government is waiting for before sending its great military expeditions against the secessionists at the South. Since the first introduction of cannon they have been playing constantly a more and more important part in battles. Even in the time of the first Napoleon, an army without cannon was regared as unarmed. When Napoleon crossed the Alps, the commander of the fortress of Bard wrote to his superior officers that he had seen a great body of cavalry defiling along a bridle path upon the side of the opposite mountain, but as no cannon could pass the fortress, the Austrian armies in Italy might feel perfectly safe. The French engineers, however, strewed straw on the road, and took the cannon along in the night under the very walls of the fortress; and Italy was conquered. During all the wars of Napoleon, he was steadily augmenting the number of his cannon, and learning by experience to lean with increasing confidence upon their efficiency. The terrible charge of the Scotch Greys at Waterloo, disabled sixty pieces of the French artillery, and probably decided the fate of the day.

A great development of the artillery branch of the service took place in the last war of England and France against Russia. It was generally understood among military men that the Malakoff might have been retaken by the Russians, but the place had been in fact conquered by the cannonade which preceded the assault; probably the most terrific cannonade that has ever taken place. Gen. McClellan witnessed that cannonade, and the importance which he had been taught in his military studies to attach to artillery was probably exalted by that tremendous display of its power. When he took command at Washington, he immediately called for a large increase in the number of cannon, and the greatest display of energy that the administration has yet made, has been in complying with this demand. We have already given an account of the manufacture by Messrs. Althause & Sons, of the carriages for fifty-five pieces, and we are receiving accounts from various directions of the manufacture of large numbers of cannon by other parties. The Sixth Rhode Island battery passed through this city on the 6th inst.; making 36 pieces furnished by that little state. We presume that Gen. McClellan must have now several hundred cannon in his army.

As far as we can learn the new cannon are all of the same size—six-pounders; and in this we think that McClellan has shown good judgment. We hope that he has shown equal sagacity in selecting projectiles; that especially, he is not going to use those which will slaughter his own troops.

The secessionists have also been adding largely to their supply of cannon, the Tredegar Works having been running, it is said, day and night for several months. The next great battle will be at least a noisy one.

CAUTION—GUN COTTON AND GUNPOWDER.

Knowing that good shooting cannot be executed with a foul rifle, and as common gunpowder leaves much residue in the barrel, it has been suggested to us on several occasions lately, that gun cotton should be tried as a substitute, because it is so cleanly to use. We must caution all those who desire to experiment with gun cotton in rifles. It is exceedingly dangerous to use with small arms as it ignites very rapidly.

In September, 1847, Mr. Gilbert Smith, of this city, in a letter which was published on page 22, Vol. III., SCIENTIFIC AMERICAN (old series), stated that he had a fine rifle with a cast steel barrel weighing 12 lbs., and carrying 75 round balls to the pound, which was completely "blown to pieces" at the breech with a charge of only 12 grains of gun cotton. The explosion was so violent that a piece of the barrel weighing half a pound was carried through the roof of the building in which he made the experiment. Gun cotton may yet be modified and improved to take the place of dirty black powder, but let great care be observed in making experiments with it.

Several experiments with gun cotton were made by officers of the army and navy at Washington, in 1857, the result of which was a report against its use for small arms. The report stated that by inserting two charges in a musket, a circumstance which often occurs with a saldier, his musket barrel would be certainly shivered to pieces. We have examined paper nearly as inflammable as gun-cotton, and which is now used for making cartridges. It is a good improvement, as it is entirely consumed in the discharge, and tends to keep the interior of the rifle clean.

THERE are 5,030 miles of railway in operation in France. The number of locomotives on them is estimated at 2,700, averaging 300-horse power each.

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TRIAL TRIP OF THE GUNBOAT PEMBINA.

On Friday, the 4th inst., the gunboat *Pembina*, the hull of which was built by Thomas Stack, of Brooklyn, E. D., and the engines by the Novelty Works, sailed upon a trial trip, for the purpose of testing the working of the ship and machinery. She left the Novelty Dock at 10 A. M., and dropped down the river easily, the engines making between 75 and 80 revolutions per minute, and the ship about 7 and 8 knots under the easy steam pressure carried. Before proceeding to the details of the trip, we will state for the benefit of our distant readers, that the gunboat is one of the twenty-one recently built for the government by act of Congress; they are all of the same model and dimensions, and of the same motive power —with the exception of some change in the plan of the engines. Those in the *Pembina* are horizontal, indirect-acting engines, having Sewall's surface condenser. The cylinders are two in number, and rest upon wooden keelsons, the bedplates for the condenser and other portions of the machinery being directly opposite the cylinders. There are two rods to each piston which connect to a crosshead remote from the cylinders, and whose guides rest upon the bedplate proper; the pillow blocks for the main shaft are bolted, and cast to the faces of the cylinders, and the connecting rod drives the propeller from the crosshead before mentioned. The piston rods are not in a direct plane with the shaft, but pass, one above and the other below its center. From these piston rods are the pumps—the air and water—driven. The valve motion is derived from two eccentrics upon the main shaft, modified by the ordinary link motion. The whole of the machinery is exceedingly compact, and snugly put together, as it must necessarily be to come below the water line. The engines and boilers being both below the line of flotation, and protected by the coal bunkers, are, in all ordinary cases, out of the way of injury from shot. The diameters of the cylinders are each 30 inches by 18 in stroke of piston. The shafts are 6 inches in diameter, and some 40 or 50 feet in length; the diameters of the air pumps are 10 inches, and the stroke same as that of the piston. These are the ordinary pumps attached for feeding boilers, having rubber valves, which close noiselessly. In addition to these, the engine which furnishes the artificial draft to the furnaces also drives a pump. The bearing brasses of the main engines are all cast hollow, and have pipes attached which permit a stream of water to circulate through them, insuring coolness under ordinary circumstances. The boilers are two in number, and separated but a few feet from the machinery; they are peculiar in shape in order to accommodate them to their snug berth. They are of Martin's patent, having fixed smokestacks, and 2,000 feet of heating surface each.

The specifications require 100 revolutions per minute of the propeller-shaft, which were readily obtained, though that speed was not maintained on the outward trip, there being no occasion for it. The consumption of coal per hour was 960 pounds, and the steam averaged 30 pounds per square inch, the maximum number of revolutions, cutting off at 13 inches of the stroke, was 106 per minute, the minimum, 88; the mean number of knots per hour made by the vessel was 982, and the highest velocity, with slack current, 11 knots per hour. As regards the speed and performance of the machinery, there was nothing more to be desired; the vibration of the vessel was not greater, nor indeed so great as we have felt in other screw propellers; the experiment was one which has no "ifs" or "buts" to haunt it afterward. The builders of the hull and machinery have cause to congratulate themselves on such favorable specimens of their skill. The trip will long be remembered by those who took part in it, as one of the most delightful of its kind. Steaming down the beautiful bay in the rapid vessel, upon that warm October day, the Narrows came into view, and the grim fortifications at each side let us pass peacefully on. Afar in the horizon the thin smoke of the Indian Summer veiled everything in mist and doubt, only here and there the spectral spars and rigging of some huge clipper showed dimly through the haze, soon to be resolved into tangible reality upon our rapid approach; the hights of Staten Island lay basking and shining in the warm afternoon light, and down the pleasant shores of Long Island the timid coaster crept furtively upon its way, or else, with tautened line and foaming bow, some vigorous little towboat pulled manfully for the deep blue sea, with its merchant vessel in tow, crowded with curious faces; along the docks and down the bay the whistles of passing steamers gave the *Pembina* greeting, and the "Stars and Stripes" waved her on. A lunch was prepared in the cabin, to which the friends of the builders repaired at the usual hour. About 2 o'clock, P. M. the *Pembina* arrived at the Navy Yard, having gone thither to receive her armament, and be fitted for sea. Mr. William Everett, Secretary of the Novelty Works; Mr. Zeller, Chief Engineer in Navy; Capt. Comstock, and the builders were present on the trip, and seemed highly gratified with the results.

THE GREAT EASTERN SAVED BY THE SKILL OF AN AMERICAN ENGINEER.

In our issue of the 12th inst. we published a graphic account of the disaster to the monster steamship *Great Eastern*. It is a fact worthy to be widely circulated, that the ship was saved by the timely skill and ingenuity of an American engineer—Hamilton E. Towle, of Boston. It will be recollected that in consequence of the breaking of the rudder shaft the ship became wholly unmanagable, and was thus left to the mercy of the restless sea. In this terrible emergency, when the wit of man seemed unavailing to save the ship and her precious freight of eight hundred human beings from destruction, Mr. Towle devised an ingenious arrangement, which was adopted by the officers in command, and the vessel was soon put on her way back to the port of Cork, Ireland, where she arrived on the 17th of September, after a most terrible experience and narrow escape from destruction. It is gratifying also to know that the timely aid of Mr. Towle has been duly acknowledged by the English press. We are preparing, and shall soon publish an engraving of Mr. Towle's impromptu device, which he has explained to us personally. Mr. Towle was for three years and a half superintending resident engineer of the Austria dry dock works, constructed upon the plan of Gilbert, who is also an American. Over one million dollars were expended on these docks, and they have given the highest satisfaction to the Austrian government. We have much pleasure in recording these facts, as they are highly creditable to Mr. Towle, who is a young man.

THIRST.

The recent surrender of Col. Mulligan's command at Lexington has awakened a great interest in the subject of thirst. The gastric juice which is secreted by the stomach, has a most wonderful property. While it dissolves dead meat and even bones very rapidly, it exerts no action whatever upon the living coats of the stomach so long as these are in a healthy condition. But if the stomach becomes inflamed from disease, it is then liable to be dissolved by the gastric juice. This result generally occurs in the case of death from thirst. It is suposed that in nearly all cases of supposed death from starvation, the actual and immediate cause of death is the want of water. Where water can be procured, the terrible inflammation of the stomach is allayed, and life is prolonged. Persons have lived several weeks without food, very rarely more than two or three days without water.

The system is constantly giving off water by the kidneys, lungs and skin, and though a small portion of this is produced by the combustion of hydrogen in the system, nearly all must be supplied by taking the liquid already formed into the stomach. All the organs of the human body, not only require to be kept constantly moist in order to operate properly, but they are to a large extent formed of water. If, from a body weighing 144 pounds all the water is dried out, there remains only 44 pounds of other substances. As the system is formed and operated on the principle of constant waste, a new supply of material is absolutely essential to its existence; and the feelings of hunger and thirst are introduced to urge the sentient being to furnish this necessary supply. These feelings increase in violence in proportion to the urgency of the system for their gratification, until, at the approach of death, the ragings especially of thirst become absolutly intolerable. The men of Col. Mulligan's command encountered a foe more formidable than is ever met with in battlefield, a foe whose power is irresistible.

ENGLISH STEAM PLOW IN AMERICA.

One of Fowler's English steam plows imported into this country, was tried on the 1st instant near Philadelphia in the presence of a Committee of the Agricultural Society of the County, and a large number of invited visitors. Fowler's steam plow has already been described in the columns of the SCIENTIFIC AMERICAN; but in a few words we will again state that it consists essentially in stationing a portable engine on the head land of the field, and drawing a set of plows through the soil by a wire rope guided and upheld by supports and wound upon a drum. The engine of this plow is placed upon a carriage, the front wheels of which turn on a swivel in any desired direction.

The field in which the experiment was made extended 360 yards between the head lands. Four plows were used upon the traveling frame of the wire rope, and they repeatedly turned over four deep furrows the entire length of the field in five and a half minutes. The engine is 12-horse power; the cost of it and the apparatus is $3,000. The power of this engine is wholly applied to dragging the plows; none of it is consumed in moving itself while plowing. This is held to be a great advantage over those steam engines which have to move themselves with their plows over the soft soil. Fowler's plows have thus far been the most successful in England.

Philadelphia seems to be a fortunate place with respect to experimental steam plow exhibitions. It was in the vicinity of the "City of Friends" where Fauke's steam plow, illustrated on page 161, Vol. I. (new series) SCIENTIFIC AMERICAN, was first tried in 1858, and it is now the scene of the first efforts to introduce the English steam plow.

So far as it relates to the practical application of steam power to plowing, this has been settled long ago—it is perfectly practical and successful. The question of animal *versus* steam plowing is now narrowed down to one of relative expense. In England steam plowing has been made profitable on some large farms, and it has been thought that equal, if not greater advantages, would be obtained from the system upon the very large and level farms on our western prairies. The ability to plow a large extent of land in a very few days with a steam plow during our short spring seasons, is a consideration of great importance, but there are other considerations which must also be taken into account. Thus, animal power is twice as expensive in England as it is in the Western States of America, and as it requires about six persons—men and boys—to attend a Fowler's steam plow, it does not appear to be suitable for the west where manual labor is so scarce and expensive. This question, however, can only be decided by a series of carefully conducted experiments, which we trust will soon be inaugurated. We have directed attention to the main point requiring to be decided in America—the relative economy of the two systems of plowing—because we have noticed that several of our cotemporaries have treated this subject under the mistaken idea that plowing by steam power had not yet been rendered perfectly practicable.

FEEDING WATER TO LOCOMOTIVES WHILE RUNNING.

The London *Engineer*, in one of its late issues, contains an illustration of the locomotive on the London and Northwestern Railway, England, constructed by Mr. J. Ramsbottom, the Superintendent, which supplies itself with water from a tank while running. The *American Railroad Journal*, in its issue of the 5th inst., describes this invention as if it were entirely new. On page 231 of the last volume of the SCIENTIFIC AMERICAN, we stated that it was an American invention, patented in 1854, and illustrated on page 137, Vol. X. SCIENTIFIC AMERICAN (old series). There is no essential difference between the English and the American mode of feeding locomotive boilers. As it is said to have been successful in England, and is in practical use, why should it not be applied to those American locomotives which have long runs to make between stations where passengers and freight are taken on and put off?

AN unusual quantity of yellow amber was thrown upon the shores of the Baltic, during a late storm. In one night more than five hundred dollars worth was collected.

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Electro-Chemical Coloration and Deposit of the Peroxyd of Iron on Sheets of Iron and Steel.

BY M. BECQUEREL.

We translate the following article from *Le Génie Industriel*. It will be found interesting by electro-platers.

In a memoir recently presented to the Academy of Sciences by M. Becquerel, on electro-chemical coloration and the deposit of the peroxyd of iron on sheets of iron and steel, the author mentions that Priestly was the first who obtained colored rings with electricity, in receiving on sheets of metal, by means of points equally metallic, directed perpendicularly to their surface, strong discharges from batteries having in the neighborhood of two square yards of surface.

Nobili, in 1827, produced also colored rings, on sheets of platinum, gold, silver and brass, in communication with one of the two poles of a pile, and plunging in solutions metallic and non-metallic, then directing perpendicularly to their surface a point of platinum in relation with the other pole.*

With the positive agent, for example, and a solution of marine salt, he obtained a series of concentric circles, surrounded with varied irises, the contact of the air enfeebling and confounding the teints a little; in heating the sheet all the rings took a red color.

M. Becquerel began to occupy himself a little with the electro-chemical coloration of metals in 1843; his researches having principally for aim not to produce colored rings, but to deposit on sheets of gold, platinum, copper, silver, &c., thin and uniform layers of peroxyd of lead, presenting successively, according to the duration of the operation, which was in general very short, the rich colors of the spectrum. The process consists in plunging into an alkaline solution of the protoxyd of lead, the piece to be colored, put in communication with the positive pole of a nitric acid battery, composed of several couples, and closing the circuit with a platinum wire in communication with the negative pole, and of which the point alone, which solely touches the alkaline solution, is always in movement. The protoxyd of lead in contact with the object to be colored, which forms the positive electrode, peroxydizes itself, becomes insoluble in the alkali, and deposites itself on the surface in thin layers, with adhesion, producing the colors of thin plates. These colors, in contact with the air and light, become enfeebled little by little, an inconvenience which the author had anticipated, and which may in great part be avoided by covering the colored surface with an alcohol varnish, which acts only very feebly on the peroxyd. With a little practice, all the teints desirable may be given to an object of large dimensions, having ridges and channels, and in painting, so to say, each of the parts which compose it with the colors which are proper to the several parts. These colors may be rendered unalterable by a process which will be presently described.

If for the solution of the peroxyd of lead is substituted a solution of the protoxyd of iron in ammonia, and for the sheet of platinum or gold, a sheet of polished iron, there will be deposited on the latter a layer of the peroxyd of iron, with reddish brown teints which gradually deepen as the thickness of the layer increases; this will not pass a certain limit in consequence of the bad conductibility of the peroxyd.

In a memoir, presented also to the Academy by the author, on the precipitation of metals from their solutions by other metals more oxydizable, he showed that in plunging a sheet of copper into a solution of the double chloride of potassium and of platinum, heated to 60 degrees, the platinum deposits itself on the copper with adhesion, producing a plate which is altered promptly in the air, taking at first a light brownish grey teint, which gradually deepens.

This alteration is due in part to the presence of the protochloride of copper which deposits itself at the same time as the platinum toward the end of the operation. By washing the platinized copper with water acidulated with acetic acid, or by rubbing its surface with cotton and colcotar, the protochloride is removed, and the alteration ceases, or at least manifests itself only after a long time, probably in consequence of the action of the air through the interstices of the platinum, which constitutes with the copper a voltaic pair. The brown color of the platinum is that which the protochloride of copper exposed to the air and light ordinarily takes.

If platinized copper is employed at the instant when it comes from the solution of the double chloride, as a positive electrode to decompose water with a battery composed of a few elements, there are produced, under the influence of the oxygen disengaged at the positive pole, some effects of coloration, having a particular character, seeing that the teints pass immediately from blue to deep crimson, which the protochloride of copper altered by light does not give; when it is in presence of platinum, this latter metal intervenes in the effects of the coloration. In operating with the platinized sheets treated previously with the acidulated water or with colcotar, nothing similar is obtained. M. Becquerel adds that the colors produced are unalterable in the air, an observation which is not without importance, since it has permitted, as we shall presently see, to obtain with the peroxyd of lead, colors which are also unalterable.

Heat applied gradually to the platinized pieces, not preserved, gives effects of coloration similar to the preceding, due to the layers of oxyd; but the teints are not as brilliant.

If there is employed, as a positive electrode to decompose water, a sheet of copper covered with a stratum of peroxyd of lead, giving one of the beautiful colors of the spectrum, it is found that at the end of a few minutes the coloration is preserved; result similar to that obtained with the platinized copper. If the electro-chemical action is allowed to continue for some fifteen minutes, according to the force of the current, the violet teints become enfeebled and pass to green and yellow; the peroxyd of lead, which is the base of the coloration, not being able to experience any change at the positive pole, it is probable that the secondary products formed at the positive pole, which are acids, react on the peroxyd to decompose it.

The colored sheets, thus preserved, appear to be in the same condition as iron, when it has been plunged into nitric acid, or when it has served as a positive electrode to decompose the same acid; it is then in an abnormal condition, not being attacked by nitric acid.

When there is deposited electro-chemically on a sheet of gold or of platinum, by means of a solution of the double chloride of potassium and of platinum, not containing copper, a very thin layer of platinum, this layer experiences no change, either in the air, or when the sheet is employed as a positive electrode, to decompose water; but this is not the case when the solution contains copper; then are produced the effects of coloration hereinbefore described, when the proportion of copper is very small, dilute nitric acid does not destroy the coloration of the platinum; a precious advantage for applications.

The solution of the double chloride of potassium and of platinum in the hyposulphite of soda, gives magnificent effects of coloration.

Finally, the deposits of peroxyd of iron on iron and steel, which are already very nearly unalterable in the air, become entirely so, when the pieces have been employed as positive electrodes to decompose water.

*Nobili, en 1827, produisit aussi des anneaux colorés, sur des lames de platine, d'or, d'argent, de laiton, en communication avec l'un des deux pôles d'une pile et plongeant dans des dissolutions métalliques et non métalliques, puis dirigeant perpendiculairement à leur surface une pointe de platine en relation avec l'autre pôle.

In a late report of the British Consul at Bahia, it it is stated that diamonds valued at $3,250,000 are annually sent from that place. The diamond mines of Brazil are to the natives what the gold mines of California are to our miners.

A small iron screw boat having gas engines, has lately been making experimental trips on the river Seine at Paris. The French papers say, the engines were built by an American inventor, and that they are the prelude to others of much greater dimensions

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The American ship *Great Republic* arrived at Liverpool in July last, from San Francisco with a cargo of 3,000 tuns of California wheat. She made the passage inthe short space of 95 days.

The Eye and Vision.

Although we derive so much pleasure and obtain so much knowledge through the sense of vision, very few persons are really acquainted with the powers and peculiarities of the eye. Thus our range of vision is bounded by the projecting parts of the face. In relation to this Dr. Alfred Smee says:—"If the eye be steadily directed toward one point it is sensible of the presence of objects over a vertical range of about 121° and a lateral range of about 149°." But perfect vision is only obtained over a range of about 2° 18′, which in practice is in the relation to the distance of the object to be viewed as 1 to 25. Thus at 25 inches distant, a person will be enabled to read a word one inch long without the slightest motion of the eye, and at twelve inches distant a word half an inch long may be read in the same way. Where the optic nerve penetrates the eye, the retina is insensible to light, which causes a total loss of vision over about 6° 20′—the commencement of the insensible spot being 12° from the center of vision. As the result of this there is a portion of the field of view, equal to one-eighth the distance of the object, which is utterly lost; and though it seems at first thought incredible, it is nevertheless true, that in regarding a range of hills eight miles distant, one mile of the range is not perceived by the eye."

Heavy Freight Business.

The *American Railroad Journal* says that the pressure of freight to the seaboard is so enormous at present that the Erie and Central companies are compelled to refuse large quantities at even advanced rates. The Pennsylvania Central Railrod notifies its western connections that it does not desire any more western freight for New York, Boston, or Baltimore, until further notice. The local business of the line, with what it gets from the Pittsburg, Fort Wayne and Chicago Railroad, and government transportation, exhausts all its facilities.

The Detroit *Advertiser* of 30th ult. says: "The Michigan Central Railroad freight business the past week has been heavier than ever before known. It even surpasses that done in the busy years of 1855 and 1856. The freights arriving at the depot in this city are so large that all the propellers in commission are unequal to the work of carrying them away, working to their utmost capacity. The Michigan Southern Railroad is bringing in large quantities of live stock. On Saturday one way bill contained five hundred head of beef cattle."

Professor Raphael on Gunshot Wounds.

In an address lately delivered by Professor Raphael on the above subject before the students of the Medical College in this city, he said, "the proper treatment was exceedingly simple. After the ball was extracted and the hemorrhage arrested, the wounded parts should be approximated, the lint bandaged and set at rest, and some simple astringent applied to the wound. Gunshot wounds never healed by primary union, but by the process of suppuration, granulation, and cicatrization. The approximation should be effected either by adhesive strips across the wound or by bandaging the limb above and below the wounded part, leaving a place open at the precise spot of the wound about the size of or a little larger than the wound. It should then be bathed with cold or warm water, as the patient might wish."

The Nascent State.

The word nascent is from the Latin word, *nascens*, and signifies being born. When water is decomposed, the two gases, oxygen and hydrogen, as they are being evolved, are said to be in the nascent state. In this state they are more ready to unite with other substances than they are after they have remained awhile separate. The same is true of other elements; just as they are in the act of being decomposed, they are more ready to form new combinations. This property is rendered available in chemical manipulations; combinations are formed by presenting the elements to each other in the nascent state, which it would be impossible otherwise to effect. A young widow is in the nascent state.

It is not known who invented the rifle. Its principle was well known to the North American Indians when the continent was discovered. Their arrows were feathered spirally and moved in the same manner as a rifle ball.

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"The London Engineer" on Fairbairn's Address.

In a leading editorial on Fairbairn's address, copious extracts from which we recently published, *The Engineer*, after some justly complimentary remarks, makes the following criticisms :

Taking note of but a single one of his remarks under the head of chemistry, we shall with that exception confine our criticism of his address to that portion devoted to mechanical science. Impressed, over much perhaps with the *eclat* of M. Fremy's appearance before the French Academy, Mr. Fairbairn has not only given his adhesion to the still mooted "nitrogen theory" of the composition of steel, started in 1857, by Mr. Binks, but he expresses his belief that, "in a few years these discoveries will enable Sheffield manufacturers to replace their present uncertain, cumbrous, and expensive process by—" what? Why, Mr. Mackintosh's (of Glasgow) slow and costly process of carbonizing highly heated wrought-iron bars, by directing over them a current of purified coal gas. If this be all Mr. Binks's and Mr. Fremy's researches are to give us, we may well say "thank you for nothing!"

As to steam navigation, Mr. Fairbairn stands up for the paddle as a better instrument for attaining speed with the least power, than the screw. But where is the proof of this? There are no screw ships running which have as large a proportion of power to tunnage as obtains in fast paddle steamers, but we have nothing to show that the screw has more slip than the paddle, or that screw engines have more friction than paddle engines. If there be any inferiority it must, of course, be either in respect of slip or friction. The *Warrior* has less engine power in proportion to displacement than the *Persia*, but the former is likely to go as fast as the latter, and we hardly think that, in any case where the vessel draws enough water for a screw of proper diameter, the paddles can have any advantage, with similar forms of ships and equal displacement and indicated power.

In speaking of bridges, Mr. Fairbairn, we might suppose, would be quite at home. Here, however, if anywhere, his statements were inaccurate, and his arguments specious. We had no stone arches, he said, of a wider span than 150 feet. We cannot imagine how he could have forgotton Chester bridge, with its segmental span of 200 feet, nor, even if he had referred to railway bridges only, the Ballochmyle bridge, on the Glasgow and Southwestern line, with a semi-circular span of 180 feet. So, too, he said we had no cast-iron arches wider than 250 feet, and he would have been correct had he said 240 feet, for there is no cast-iron arch standing wider than the middle span of Southwark bridge. But, while Mr. Fairbairn admits that tubular girder bridges of a span of 1,800 feet or 2,000 feet would break down from their own weight, he must have beenaware that a cast-iron arch might, if necessary, be made to support itself over a clear span of a mile. Indeed, it was only from considerations of approaches and cost that Robert Stephenson did not adopt two cast-iron arched spans of 450 feet each for the Britannia bridge; and no less able an engineer than Telford had, more than fifty years ago, designed a cast-iron arched bridge of 600 feet span, to occupy the present site of London bridge. Of suspension bridges Mr. Fairbairn said nothing.

The shareholders of our London water companies must have pricked up their ears when they heard Mr. Fairbairn's notice of a scheme for supplying the metropolis with an abundance of pure water from Wales, to be carried out by Mr. Bateman at an estimated cost of £6,000,000 or $7,000,000. It was Mr. Bateman, we believe, who estimated that it would cost £12,000,000 to bring the water from Bagshot Sands into London, irrespective of the sufficiency or otherwise of the supply; and if the same engineer can manage to bring the sparkling element from a distance four or five times greater for half the money, he will do well. We should, nevertheless, be glad to see the scheme carried out, if £30,000 a mile, which if a good deal of money, can accomplish it.

After paying a high and deserved compliment to Mr. Whitworth's rifled cannon, and adverting briefly to the question of ocean telegraphy, Mr. Fairbairn expressed his views upon patents. To sink all considerations of the rights of inventors in questions of public expediency would be, he thought, a dangerous doctrine, and he expressed the hope that it would never be acted upon. "I cannot see the right of a nation to appropriate the labors of a lifetime without awarding any remuneration. The nation, in this case, receives a benefit, and surely the laborer is worthy of his hire. I am no friend of monopoly, but neither am I a friend of injustice." Such language carries with it the force of reason and justice, and is in honorable contrast with that indulged in by those who have shown so much greater aptitude in stealing the inventions of others than in inventing for themselves. Mr. Fairbairn admitted the necessity for patent reform, but this is another and very different thing from patent abolition.

Recent Foreign Patented Inventions.

Cop-tubes for Spinning Frames—J. Bayley, J. Quarmby, and E. Burns, England, inventors. This improvement consists in forming cop-tubes from strips of thin sheet metal, of a spiral shape, and producing a screw thread, of any degree of fineness required, upon the external surface, for the purpose of retaining upon the tube the yarn as it is spun. Common cop-tubes have plain surfaces, hence they require great attention on the part of the spinner, and a very delicate adjustment of machinery. The new cop-tubes, having a fine spiral surface, hold the yarn more firmly upon them.

Toothache Curative.—M. A. Prenslan, of Liverpool, England, has patented a cure for toothache, consisting of what he calls "oil of paper." He burns paper and collects the oil obtained from its combustion, which he uses as the specific for toothache. The curative thus obtained is "creosote," which is very frequently used for this purpose. Mr. Prenslan was not sufficiently versed in chemistry to be aware of the nature of what he has called "oil of paper" to be essence of smoke.

Shooting Spectacles.—J. Broham, of Bristol, England, has patented a mode of adapting to spectacles additional glasses, which are capable of being brought over the eyes or removed therefrom with facility, without removing the spectacles from the head. The additional glasses are jointed to the spectacle frame on a swivel joint, so that they can be pushed above from the line of sight in an instant. These glasses are rendered very useful to rifle-shooting, where great steadiness of sight is required. The eye-discs are made of metal, or some opaque substance, with a small hole in front of the center of the pupil of the eye, and thus the delicate nerves of the eye are not disturbed by a strong glare of light. These additional glasses may be made of any desired focus, and of colored glass for weak eyes.

Breaking Flax.—E. Brosier, of Deptford, England, patentee. This invention consists in breaking and drawing the fibers of flax and hemp between two fluted rollers of different diameters, which have an alternate back and forth motion. These draw the slivers of flax to their full length in one direction, then reverse and pass them backward, and so on, until the fibers are separated and the shive or woody portions are completely broken.

Pig Singeing.—H. G. Prosser, of Waterford, Ireland, has taken out a patent for singeing the bristles on the carcasses of pigs. He passes the defunct animals through a highly-heated iron chamber of an oval shape, and thus he makes the hog-wool fly.

Night and Day Telescopes.—J. Browning, England, has applied for a patent in a telescope designed to answer for a night and day spy glass. He employs a larger object-lens than would be employed for a day telescope, and he adds an additional slide to the usual "drawer," by which the focus is adjusted. This additional slide is only to be used in the day time, when a high power is advantageous and the atmosphere is clear. The slide is not drawn out when the glass is used at night.

WHAT IS NEEDED.—We need for our dwellings more ventilation and less heat; we need more out door exercise, more sunlight, more manly, athletic and rude sports; we need more amusements, more holidays, more frolic, and noisy, boisterous mirth. Our infants need better nourishment than colorless mothers can furnish, purer milk than distilleries can manufacture; our children need more romping and less study. Our men neen more quiet, and earlier relaxation from the labors of life. All men, both young and old, need less medicine and more good counsel

RECENT AMERICAN INVENTIONS.

Improvement in the Manufacture of Ordnance.—This invention relates to the application of a wrought-iron reinforce to a gun having its body or main portion of cast iron; and it consists in a peculiar mode of shrinking the reinforce on the body, whereby the heating and expansion of the body in a very high degree by heat communicated to it from the reinforce is prevented, and the reinforce is caused to be drawn equally close all round the body. The character of the process is explained by the claim. Patented by R. P. Parrott, of Cold Spring, N. Y.

Drawing and Spinning Machinery.—This invention consists in the employment between the rolls which deliver the soft roving, and the spindles of ordinary spinning machinery, of drawing rolls of cylindrical form so applied and operated as to be separated at intervals of time and at distances capable of accurate regulation, said intervals of time being capable of regulation both as to frequency and duration, whereby the twist produced in the spindles is allowed to run back past said drawing rolls, to a greater or less extent as desired, and the yarn in consequence drawn with greater perfection and evenness than by the usual systems of spinning, and with less risk of breaking in certain kinds of work. Patented by J. H. Bloodgood, of New York city.

Cap and Havelock.—This invention, patented by J. K. Gittens, Jr., of Greenpoint, N. Y., consists in interposing a layer of cork between the body of the cap or hat and the lining, and also having the havelock lined or filled with the same material, which, on account of its non-conducting property keeps the head cool as well as the neck, and also admits of perfect ventilation, as a thin layer of cork is perfectly porous.

JOLLY ENEMIES.—When the war broke out between Denmark and Sweden, as it invariably did some fifty times in the course of each century, Peter demanded permission to enter the royal navy, and was at once appointed to the command of a vessel called the *Worm*, bearing four guns. Endless are the anecdotes related of his daring. On one occasion he met with an English privateer. "If that frigate were Swedish," he exclaimed, "I should take it; but the English have too much practice, and fight too well for me to hope for an easy conquest." The vessels engaged, and a hard-fought battle ensued, such as always takes place, and will take place when Danes and English meet in warfare. "I have no more powder," cried Torkenskiold; so he sends a flag of truce on board, requesting the English captain to lend him some that he might continue the battle, or, if he would not, begging him to come on board and receive the respect due to so gallant an enemy. The Englishman declined, so they drank to each other from their respectiye vessels, and cheers rose from the Danes as the captains raised their glasses, vociferously returned by the delighted British sailors.

BREAK IN THE PENNSYLVANIA CANAL.—The Western Division of this once great improvement seems to be particularly unlucky. It has not been in navigable order for more than two or three weeks during the past year. Owing to the very heavy rains last week, another break happened, and the "ditch" was once more dry. The double stone lock at Dam No. 3 on the Kiskimbinetas, was washed away, together with the storehouse and dwelling. The Leechburg bridge of three spans was also washed away. The heaviest rise was out of Clarion river, sweeping away the bridges and a large quantity of lumber ready for shipment.

FRESH TOMATOES TILL WINTER.—If late in the season, just before frosts, the vigorous late-bearing tomato vine be pulled and hung up in a moderately dry cellar, the fruit will gradually mature and thus furnish the table with fine luscious tomatoes from time to time, even into the winter season. So say they who have tried it.

COLD FEET.—If you have cold feet immerse them morning and evening in cold water, rub with a rough towel, and run about your room till they warm. In one month you will be entirely relieved. All these red pepper and mustard applications are like rum to the stomach, relieve you to-day, but leave you colder to-morrow.

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Patent Claims

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING OCTOBER 5, 1861.

Reported Officially for the Scientific American.

PATENTEES, READ THIS.

The new Patent Laws which went into force on the 2d of March last, authorized the Commissioner of Patents to have all the specifications which form part of the Letters Patent printed.

This is a wise provision, and it renders the documents much handsomer than the old system of engrossing them on parchment; besides, in passing before the printer and proof reader, the clerical errors, which were often made by the copyist, are mostly obviated, thus rendering the patent more likely to be correct.

But to afford the printer and proof reader an opportunity to do their work properly, the Patent Office is obliged to withhold the Letters Patent after granting them, for about *four weeks* after the claims are published in the SCIENTIFIC AMERICAN.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

2,369.—E. F. Barnes, of New York City, for an Improved Telegraph Instrument:

I claim, first, The application and use for the purpose of transmitting and recording letters and figures substantially as set forth, of five wires, or their equivalents, corresponding to the five elemental or distinct parts of such letters and figures.

Second, The combination of the transmitting levers, A A, and movable letters or figures, with a series of five wires, substantially as set forth.

Third, The combination of a series of magnets, D D, and recording or inking surfaces i i′, substantially as described, with a series of five wires, for the purpose of recording letters, &c., by the action of the electric current acting mechanically.

Fourth, The arrangement of the electro-magnets, D D, and the levers, E E, substantially as described, the magnets acting directly upon such levers, and such levers being made the armatures of the magnets in combination with the use of a series of wires and recording apparatus, as set forth.

2,370.—J. H. Bloodgood, of New York City, for an Improvement in Machinery for Drawing and Spinning Wool:

I claim, first, The employment between the delivery-rolls and the spindles, of drawing rolls of cylindrical form, so applied and operated that they may be separated at intervals, capable of accurate regulation, substantially as described, and for the purpose set forth.

Second, The employment for effecting the separation of the drawing rolls, and regulating the frequency, duration and amount of said separation of a system of mechanism substantially similar to that described in combination with the movable rolls E′.

Third, The combination of the drawing rolls, E E′, capable of separation as described, with any of the usual forms of drawing rolls as applied to the various staples used in the manufacture of yarns, for the purpose of rendering the process of spinning more perfect.

2,371.—Cornelius Bollinger, of Glen Rock, Pa., for Improvement in Pumps:

I claim, first, the bridge, R, platform, N, and plunger, F, in combination with the pipe, L, cavity, I, and valve, K, when arranged and operated as set forth.

Second, I claim the elastic ring packing, H, in combination with the flange or rim, G, and contraction, C, in the cylinder, A, when these parts are arranged in relation to the stationary fulcrum, O, in the platform, N, as and for the purpose specified.

2,372.—Morris Bradley, of Empire Ranch, Cal., for Improved Gold Washer:

I claim, first, The placing the grate bars on riffles wider apart, at the end next the discharge, so that it is impossible for them to become clogged with dirt or other matter.

Second, I claim the opening and discharge in the side and near the bottom of the main sluice.

Third, I claim the arrangement of the gate in connection with the others.

Fourth, The small sluice as connected with and laid parallel to the main sluice.

The whole when combined constituting a new and useful invention.

2,373.—James Brewer, of Albany, Ill., for Improvement in Combined Harrows and Sowers:

I claim, first, The combination of main harrow, C, revolving harrow, D, and seed-box, A, with revolving shaft E, seed buckets, e e, and convex spreaders, F F, substantially as and for the purposes set forth.

Second, The combination of lever, G, with seed-box, A, and hinged frame, I, substantially as and for the purpose set forth.

Third, The combination of hinged lever, I, with seed box, A, and its supporting axle, B′, and wheels, B B, substantially as and for the purposes set forth.

Fourth, The combination of lever, I, seed box, A, and main harrow, C, for elevating and turning the same upon the axis, C, of the harrow, D, substantially as and for the purposes set forth.

2,374.—C. F. Brown, of Warren, R. I., for Improvement in Projectiles for Ordnance:

I claim a projectile constructed and operating substantially as specified.

[An illustrated description of this invention appeared in our last number.]

2,375.—W. H. Devalin, of Sacramento, Cal., for Improvement in Rotary Engines:

I claim so fitting the pistons to the boxes, I I, of the piston wheel that the steam can pass between the piston and one side of the box to act upon the inner end of the pistons, substantially as and for the purpose set forth.

[This invention consists in a certain construction of rotating and radially sliding pistons, and of the boxes provided in the piston wheel for their reception, whereby the steam is allowed to get behind the pistons for the purpose of counteracting the pressure on their outer end, thereby enabling them to be forced outward toward the inner periphery of the cylinder, without subjecting the mechanism employed for the purpose to great friction.]

2,376.—John Dickinson, of Brooklyn, N. Y., for Grooved Rule and Self-Adjusting Diamond for Cutting Glass.

I claim, first, The combination of the grooved T-rule, with the table, having marginal guide ways in it, for the purpose substantially as set forth.

Second, I also claim that the combination of the metal slider, H, with the self-adjustable diamond stock, J, and grooved rule, E, made and operating substantially as described, and for the purpose set forth.

2,377.—William Ebbitt, of New York City, for Improvement in Frogs for Railroad Tracks:

I claim the triangular piece, t, in the frog plate, l or m, at the point of intersection of the three lines of track for the purposes and as specified.

I also claim the arrangement of the frogs, g h l and m, relatively to the tracks in the manner and for the purposes specified.

2,378.—W. H. Elliot, of Plattsburgh, N. Y., for Improvement in Revolving Firearms:

I claim, first, Extending the frame, a, forward of the breech-plate, d, and hanging in the part so extended forward the hammer, e, and trigger, f, when these devices are employed with chambers that are bored through and left open for the purpose of being charged at the rear end as and for the purpose specified.

Second, The employment of set screw, n, between the cocking pawl, g, and trigger, f, when said screw is so employed between these devices as to determine at what point in the motion of the trigger the hammer shall be disengaged as set forth.

Third, Resisting the recoil of the cartridge by means of a hammer pivoted underneath and forward of the rear end of the chambers, as set forth.

Fourth, The employment of a hammer so arranged in relation to the chambers that while it is pivoted underneath and forward of the rear and of said chambers its exploding point strikes up in their rear as specified.

2,379.—Thomas Foden, of Holyoke, Mass., for Improvement in the Stop Motion for Power Looms:

I claim a stop motion for the purpose described, having for its principal elements a hole, 7, and a tumbler, b, in the shuttle, a, wheel, B, having a sliding tooth, f f′, attached to one of the shuttle boxes, or to the lay, and a sliding rod, m, and arm, m′, or their equivalent, attached to the shuttle-box or to the lay; the whole operating together and in combination with the shipper, substantially as specified.

[This invention relates to an improved stop motion for stopping the loom whenever the warp, owing to the knots in the yarn, or the breakage and entanglement of threads, or from any other cause becomes in such a condition that what weavers call bad places are likely to be produced in the woven fabric; such stop motion consisting in part of a certain device attached to the shuttle, in part of devices attached to the lay, and in part of devices attached to the breast beam or front part of the loom framing.]

2,380.—P. M. Frees, of Cincinnati, Ohio, and Zenus King, of Milan, Ohio, for Improvement in Trussed Beam for Bridges, &c.:

We claim the peculiar formation or configuration of the arch, A, the same being made to increase gradually in its vertical and lateral dimensions from the ends, A′ A″, of the arch to its center or crown, in the manner described, for the purposes set forth.

2,381.—Bridge Frodsham and Morris Levett, of New York City, for Improved Knapsack and Bed in Combination:

We claim the india rubber water-tight casing, a, containing the bag of finely cut cork or equivalent material, and provided with the pocket, c, and flap, d, as and for the purposes specified.

2,382.—J. K. Gittens, Jr., of Green Point, N. Y., for Improvement in Caps:

I claim the combination of a cap or hat, A, and havelock, D, each provided with a lining or filling of cork, substantially as set forth.

2,383.—Horace Goodrich, of Stoneham, Mass., for Improvement in Printing Presses:

I claim, first, The spring frisket, N N′, provided with the hinged platen, P, and attached to the end of the reciprocating bed, B, and operating in combination with the impression cylinder, J, and cleats, q, substantially as described and for the object specified.

Second, Hanging the impression cylinder, J, in the adjustable spring-slides, K, substantially as and for the object specified.

Third, The side cleats, Q, arranged and operating substantially as set forth and for the object indicated.

2,384.—George W. Hatch, of Princeton, Ill., for Improvement in Tanning:

I claim the use of mellilotus plant as specified, in the manufacture of leather.

2,385.—Alfred Hathaway, of Charlestown, Mass., for Improvement in Paper Ruling Machines:

I claim, first, The moving of one end of the pen beam by means of a screw connected with and working parallel to the side of the frame, substantially as described and for the purpose set forth.

Second, Adjusting the regulator on the pen-beam by means of the combination of the screw, c, nut, E, and plate, A, substantially as described, and for the purpose set forth.

Third, Lifting the points of the pens from the paper or cloth, and letting them down at any desired place on the same, by means of cams, as seen on the end of cylinder, c, together with the friction rolls, D D, brake, j, shoe-shaped piece, K, and bent lever, L, either singly or collectively, substantially as described, and for the purpose set forth.

Fourth, The adjusting or angularly placing the roll, A, by means of the action or weight of the endless cloth or apron on roll, A, substantially as described and for the purpose set forth.

2,386.—Arthur Hemenway, of Townsend, Ohio, for Improved Mop:

I claim the sleeve, B, head, c, and stirrup, D, when their parts are arranged as specified, in combination with the handle, A, and loop, E, as and for the purpose set forth.

2,387.—W. E. Houston, of New Haven, Conn., for Improvement in Compositions for Articles of Ornamentation:

I claim a composition for useful and ornamental articles made of resin, shellac and sawdust, the coloring matter of which being composed of any suitable materials, and in the proportions substantially as set forth.

2,388.—George Hunzinger, of Brooklyn, N. Y., for Improved Reclining Chair:

I claim the combination of the X-shaped legs, a, swinging back, c, swinging foot board, e, and connecting bar or hook, d, in the manner and for the purposes specified.

I also claim the props, 7, applied to the board, e′, of the foot board, in the manner specified, to convert the same into a desk or table when sustained by the buttons or latches, 9 9, as set forth.

2,389.—A. K. Johnston, of Middletown, Conn., and Lorenzo Dow, of Topeka, Kansas, for Improvement in Envelopes for Cartridges:

We claim as an article of manufacture a cartridge the envelope of which is made of gun cotton, paper or other fabric, as above subsequently treated as described, by an oxygenizing salt, and by a waterproof coating, as set forth.

2,390.—Wm. H. Livingston, of New York City, for Improved Method of Attaching Handles to Picks, &c.:

I claim, first, The metallic tube, c, forming a protection or armor for the end of the handle, b, and receiving the eye of the pick or mattock or other implement in the manner and for the purposes specified.

Second, I claim the band, d, attached to the handle, b, in combination with the metallic tube, c, for the purposes and as specified.

Third, I claim the bolt, e, parallel with the handle, b, and provided with the cross key or lips, f, to act against the rear side of the eye, a, and retain the said eye on the tapering handle, as set forth.

2,391.—Adam Luckhaupt, of Columbus, Ohio, for Improvement in Wood-bending Machines:

I claim, first, The use of a wood-bending form constructed in two parts with one or more wedges or keys interposed for the purpose of loosening from the stationary part of the form, the movable part with the bent timber attached, substantially as explained.

Second, In combination with a wood-bending strap, E, I claim the yielding blocks or abutments, K, L-shaped arms, I J, and cords, X, or their equivalents, for the objects set forth.

Third, I claim, in combination with a wood-bending strap, the wooden springs, H, and tension cords, Z, arranged and operating substantially as and for the objects stated.

Fourth, The side clamps, O O′ P, applied and operating as set forth.

Fifth, In the described combination with permanent outer strap, E, and form, B, or their equivalents, I claim the detachable inner strap, S, stretcher, Q, shackle, V, and tightening nut, m, and key, R, substantially as and for the objects stated.

2,392.—G. A. Mansfield, of Boston, Mass., for Improvement in Boots and Shoes:

I claim the metallic guard or welt, constructed substantially as described, and extending either completely around the boot or shoe, or being used only at the toe, or such other parts as may be liable to uncommon external wear and abrasion, said guard or welt being applied either to the outer edge of one of Lyman's metallic insoles, or independently of the principle of his invention, merely extending inward a sufficient distance to receive the pegging, sewing or nailing.

2,393.—J. A. Marden, of Newburyport, Mass., for Improvement in Looms:

I claim the use of a roller having yielding or elastic supports for carrying the warp over it to the reeds, in combination with guiding or nipping rollers operating substantially as described for the conveyance to the reeds of the filling, whether the same be of an elastic nature or not, the whole being arranged in relation to the driving mechanism, essentially as shown and set forth.

I also claim the peculiar construction and arrangement of the mechanism for automatically regulating the tension to the threads and yarns in a loom, the same consisting of the several devices specified, so arranged and combined as to operate in unison in the manner and for the purposes set forth.

2,394.—L. H. Miller, of Baltimore, Md., for Improvement in Camp Trunks:

I claim, in combination with the main sections, a b c and d, and minor section, a′, the frames, j and j′, and their locking apparatus, constructed and operated in the manner and for the purpose set forth

2,395.—Henry Morrison, of Paterson, N. J., for Rest for Engine Lathes:

I claim the frame, B B′, made in two or more parts, the cam ring, E E′, similarly constructed and the cams, G, sliders or bearers, D, so combined and arranged that the entire rest may be opened for the purpose of inserting and removing the work, substantially as specified.

2,396.—A. N. Overton, of Knoxville, Iowa, for Improvement in Composition to be Applied to Grain to Prevent Smut:

I claim the composition of blue vitriol and common salt prepared in the manner described, for the purpose of exterminating and preventing smut.

2,397.—R. P. Parrott, of Cold Spring, N. Y., for Improvement in the Manufacture of Ordnance:

I claim the mode described of shrinking the wrought-iron reinforce upon the cast-iron body of a piece of ordnance, that is to say, by rotating the body while water is introduced into the bore.

2,398.—A. H. Platt and W. S. Rosecrans, of Cincinnati, for Improvements in Lamps:

We claim the combination of the concentric tubes, a a, converging upward, and the deflector, d, having the form of an inverted cone, substantially in the manner and for the purpose specified.

We also claim the arrangement of the separate serrated wheels, b b, extending respectively from the tubes, a a, outward just through the cone, A, in combination with said tubes and cone, substantially as described.

2,399.—A. H. Platt and W. S. Rosecrans, of Cincinnati, Ohio, for Improved Scale and Weighing Apparatus:

We claim the employment of the separate tare poise bar, D, in combination with the balance beam, B, and weighing poise bar, C which has two or more different graduations, so as to weigh according to as many different systems of weights, at the same time, substantially as specified.

2,400.—B. C. Smith, of Burlington, N. J., for Improvement in Railroad Coupling Chairs:

I claim the cast-iron chair composed of the plate, B, with its rib, C, and the sliding plate, D, with a corresponding rib when the two plates are constructed, arranged and secured together, and adapted to each other and to the rails substantially as and for the purpose set forth.

2,401.—Matthew Smith, of Pittsburgh, Pa., for Improvement in Machines for Crushing and Pulverizing Vegetable and Mineral Matter:

I claim the use of two drums of different diameters, one placed inside of the other, and both running in the same direction, with the shaft of each placed on a different plane; when said drums are used for crushing and pulverizing, as described and set forth.

2,402.—Joseph Thomas, of New York City, for Improvement in Water Meters:

I claim the stops or projections, I′ I″, carried by a movable partition, I, on slide, i, double incline, L L′, roller, M, and spiral spring, m, or their respective equivalents, arranged and operating substantially as and for the purposes set forth.

2,403.—Otis Tufts, of Boston, Mass., for Improvement in Railroad Wheels and Axles to Run on Different Gaged Tracks:

First, I claim constructing railroad car wheels in two divisions, substantially in the manner and for the purposes set forth

Second, I claim the cylinder, e, circumscribing the axle between the wheel hubs, with right and left-handed screw threads and double-acting pawls, for the purposes set forth.

Third, I claim the circular wedge, o, or its equivalent, for tightening the outer division of the wheel upon its central division.

Fourth, I claim the mechanism described for actuating the ring or wedge, o, substantially as specified.

2,404.—R. G. Turner and S. B. Robinson, of East Dedham, Mass., for an Improvement in Machinery for Washing Wool:

We claim the combination of the novel or elliptical tub, A, provided with the partition, B, the rotating paddle, C, adjustable, endless carrying apron, H, pressure rollers, I I, and endless discharging apron, K, all arranged substantially as and for the purpose set forth.

2,405.—P. D. Van Hoesen, of New York City, for an Improvement in Wringing Machines:

I claim the arrangement of the hinged jaw, B, screw, C, and cup, h, with the stand, A, shaft, D, and rubber-covered pin, E, all as shown and described.

[This invention relates to an improved clothes-wringing machine of that class provided with a pin inserted in a mandrel or shaft. The object of the invention is to prevent the clothes being injured by the action of the pin in twisting them, and also to obtain a ready means for securing the device to the wash-tub, the device also serving as a holder for soap during the process of washing.]

2,406.—Rodney Welch, of Worth, Ill., for Improvements in Corn Planters:

I claim the combination of a shifting handle furnished with a recess as described, and a receptacle with a conical bottom, arranged in the manner and for the purpose specified.

2,407.—Oliver D. Barret, of Fulton, N. Y., assignor to himself and Stephen E. Lanphear, of Cleveland, Ohio, for an Improved Clothes Wringer:

I claim the arrangement of the springs, B B B B and C C, in combination with the rollers, D D, and the screw, E, substantially as and for the purpose specified.

2,408.—Samuel S. Bent, (assignor to himself and Thomas Bent), of New York City, for an Improvement in Fireplace Heaters:

I claim, first, The metallic case, o, provided with the register, q, or openings upon its upper surface, and containing the heating pipes as set forth, when the same is introduced in the chimney behind, and combined with the grate, a, in the manner and for the purposes specified.

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Second, I claim the openings, e', in the metallic back of the grate protected by and covered with soap-stone or fire-brick lining, e, in contact with the back of said lining, e, whereby said lining does not become so excessively hot, and the circulating and warming air is increased in temperature, as set forth.

2,409.—Wm. H. Birdsell (assignor to himself and Eli Kellam), of Elizabethport, N. J., for an Improved Tackle Block:

I claim, first, The tripping ratchet, C, in combination with the hook, B, substantially in the manner described and for the purpose specified.

Second, I claim the mousing pin, D, in combination with the tripping ratchet, C, and the hook, B, substantially in the manner described for the purpose specified.

2,410.—Louis Bollman (assignor to the Grover & Baker Sewing Machine Company), of Boston, Mass., for an Improvement in Sewing Machines. Patented in England, Feb. 18, 1861.

I claim the combination substantially as described, of a vibrating hook, a lower thread post and an eye-pointed needle, operating in conjunction, substantially as specified.

2,411.—Louis Bollman (assignor to the Grover & Baker Sewing Machine Company), of Boston, Mass., for an Improvement in Sewing Machines. Patented in England, Nov. 24, 1860.

I claim, first, The combination of these four elements or parts of a sewing machine, viz., first, an eye-pointed needle; second, a seizing hook; third, a detaining hook; and fourth, a shuttle, all reciprocating and all substantially such as described, intending to claim none of these parts separately, but only in combination and acting conjointly, substantially as set forth.

Second, I claim in combination with an eye-pointed needle and a seizing hook acting substantially as specified, a loop stop, substantially such as described, and acting to aid a seizing hook in spreading loops of needle thread, substantially in the manner specified.

2,412.—Lambert Erpelding (assignor to Cyrus H. McCormick), of Chicago, Ill., for an Improvement in Reaping and Mowing Machines:

I claim the combination of a casterwheel and an arm having a freer joint and an adjustable elbow for supporting the grain side of reaping or mowing machines, substantially as described.

2,413.—Edward Hennessey, of Waterville, Maine, assignor to Cyrus Brett, of Strong, Maine, for an Improved Spring Bed Bottom:

I claim, first, Securing the elastic bands, B B, to the slats, A, by means of keys, d, fitted in tubes, c, at the outer ends of metallic loops, C, attached to the slats, substantially as described.

Second, Connecting the elastic bands, B, to the rails, E, of the bedstead by means of the double hooks, D, and the rods, f, as set forth.

[This invention relates to an improvement in that class of spring bed bottoms in which slats are connected by elastic loops to the end-tails of the bedstead. The invention consists in a novel and improved way of securing the elastics to the slats, whereby the latter are firmly attached to the elastics throughout their entire width, and a durable connection obtained.]

2,414.—Theodore F. Kums, (assignor to Mary Manny) of Rockford, Ill., for an Improvement in Automatic Rakes for Harvesters:

I claim, first, The combination of the vibrating levers, X Y, the support, T, and a rake, I, substantially as described, whereby the rake is caused to describe a complex path to gather, compress and discharge the grain by a positive motion, substantially as described.

Second, The combination of the tail piece, U, or its equivalent, the curved projecting arm, f, or its equivalent and the rake, in the manner and for the purposes substantially as specified.

Third, The combination of the lever, d, guide bar, m, and the rake, arranged and operating substantially as described.

Fourth, The notched head, k, or its equivalent on the rake handle, e, in combination with the lever, d, that gives motion to the rake handle, substantially as described.

2,415.—Theodore F. Kums, (assignor to Mary Manny) of Rockford, Ill., for an Improvement in Automatic Rakes for Harvesters:

I claim the raking mechanism constructed and operating substantially as described.

2,416.—Theodore F. Kums, (assignor to Mary Manny) of Rockford, Ill., for an Improvement in Automatic Rakes for Harvesters:

I claim, first, The combination of the diagonal link, W, the connecting link, F, and the vibrating arms, J and K, or their equivalents, substantially as described and for the purposes specified.

Second, The combination of the diagonal link, W, the connecting link, F, and rocking pin, T, or their equivalents, substantially as and for the purposes described.

2,417.—Robert Whittam, of Accrington, England, assignor to Joseph Lockett and Robert Leake, Jr., of Manchester, England, for an Improvement in Pantograph Machines:

I claim the application of the peculiar arrangement of machinery or apparatus, described and illustrated in the accompanying two sheets of drawings, for holding steel or other metal surfaces intended for dies in the same or a similar position, as the copper or other metal rollers employed in printing calicos or other surfaces are now held in all pantograph machines, so that the dies will receive on their surfaces designs in every respect the same as would otherwise be imparted to such copper or other metal rollers as aforesaid.

2,418.—Isaiah M. Williams, (assignor to himself and Wm. P. Wolf,) of Blanchester, Ohio, for an Improved Mode of Operating Churns:

I claim imparting to the churn, X, an oscillating motion by means of the platform or table, B, and pedal, F, or by using the hand lever, L, substantially as set forth.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

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PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York

New Books Received.

BLACKWOOD'S MAGAZINE. Published by Leonard, Scott & Co., No. 54 Gold Street, N. Y.

This old and favorite periodical for the present month contains several very interesting and able essays on various subjects. One on "Meditations on Dispepsia" contains much useful information, and a review of "Burton's Anatomy of Melancholy" contains quite a number of quaint and readable extracts from that old and remarkable work.

VEST POCKET LEXICON. Published by J. B. Lippincott & Co., Philadelphia.

An English dictionary of all except familiar words, including the principal scientific and botanical terms, and foreign moneys, weights and measures, by Jabez Jenkins. This is truly a valuable work, as the author says, containing what everybody wants to know and cannot readily find. We consider it one of the most useful and convenient publications of the day. The price of the book sent by mail is 75 cents

Notes and Queries

H. G., of Mo.—You will find an illustration of a plan for signal lights on page 328, Vol. VII., (old series) SCIENTIFIC AMERICAN. It is the invention of T. H. Dodge, Washington, D. C., and, we should think it might answer very well for military purposes. It consists of a pyramidal box, having a number of different colored glass slides, placed one upon another, with a lamp arranged inside, capable of being instantly moved opposite any of the colored glass slides.

L. S., of Pa.—You will find a rule for obtaining the necessary width of belt to transmit any number of horse power on page 15, Vol. II., SCIENTIFIC AMERICAN, (old series). It is this: multiply the horses' power to be transmitted by the constant number 5,400, divide the result by the velocity of the belt in feet per minute multiplied by the diameter of the smallest drum in feet, the product is the width of the belt in inches.

H. T., of Iowa.—Oblique paddle wheels for steamboats are quite old. You will find an illustration of a steamer furnished with such wheels on page 5, Vol. III., SCIENTIFIC AMERICAN (old series).

S. W. T., of Conn.—The common liquid blacking or varnish used for shoes is made by dissolving some shellac in alcohol and adding thereto some ivory black. It is put on with a sponge and gives a black glossy coat to the leather, but has a tendency to make it brittle and crack.

S. G. M., of Pa.—It is some years since we saw Dr. Drake's gas engines and we do not clearly remember how all its parts were distinctly arranged. The platinum igniting cups were placed at the ends of the cylinder, set in receivers and heated with jets of gas-light on the outside, whereby they were always kept white hot.

C. C., of Pa.—Superheated steam has been used for distilling coal oil, and so far as we know to the contrary, with success. Paraffine has been obtained from the products of distilled peat; an oil may also be obtained, but it would cost more than coal oil.

J. T. J., of Ind.—We have seen artificial arms but their hands were unserviceable. It is possible that some makers of artificial arms may have provided hands for them which are capable of executing several motions, but they have not been brought under our notice.

H. W. S., of Mass.—A filtering apparatus for the water of steam engines was illustrated on page 353, Vol. II., SCIENTIFIC AMERICAN (old series). The filtering medium used was compressed sponge the same material proposed by you. The apparatus is very suitable for filtering all muddy water used in boilers.

L. H., of Pa.—There is a United States government rope-walk at Charlestown, Mass., where superior cordage for the navy is made from American water-rotted hemp.

W. H., of Pa.—The invention of a steel-pointed ball is old. We do not know that it has ever been tried, but we are certain you could not procure a valid patent for it.

M. M., of Pa.—The conversations and declarations of an inventor, merely affirming that at some former time he had invented a machine, would not be considered competent testimony in a case of infringement. If he fully described its details and mode of operation, for the purpose of asserting his rights, this would be evidence. But it is important to preserve dates, when there is less difficulty in maintaining your rights. We advise you to make a sketch and description of your invention and make oath to it before a Justice of the Peace.

M. F., of Pa.—If you have made a machine there is no doubt you have infringed the rights of the patentee, but if you have not used it of course the damages would be merely nominal. If the patentee could prove the fact that you had built a machine in violation of his patent, he could, no doubt, obtain a verdict against you. unless you are able to show that his patent in invalid.

P. J., Jr., of Conn.—In the early history of inventions in our country, Connecticut seems to have held a prominent position. Previous to the Revolution, the manufacture of steel, iron, wire and bells was commenced. In 1775 a pin factory was put into operation, About that time an inventor claimed to have invented a clock "that shall wind up itself by the help of air." That State has maintained her reputation ever since for ingenious and industrious mechanics.

S. H. C., of Pa.—Of the minerals that you send us, No. 1 is selenite, a pure sulphate of lime, and No. 2 is silecious sinter; No. 3 is so small a specimen that we are unable to distinguish it. Dana's "Mineralogy" is the best work on the subject.

A. M. R., of Mo.—Butter exists in milk in the form of little globules, and is separated by the process of churning. The temperature at which cream or milk is churned is very important. If too low the butter will not separate at all, and if too high it will be mixed with the caseine or white cheesy part of the milk. The range of temperature for churning is from 50 to 55 degrees Fahrenheit. Butter does absorb oxygen, and thus becomes rancid and decays, though less rapidly than the butter milk; hence the importance of expelling the latter by thorough working of the butter.

F. J., of N. B.—The outer coating of Scott Russell's iron frigates consists of the thick plates, "the skin" being the inside iron lining. It is perfectly practical to put the armor plates on a frigate without a single bolt hole being made on the outside. If the plates be formed with thick back flanges for bolting to the ribs, no outside bolts will be necessary.

E. J. C., of Cal.—Zinc may be purified by melting it with an equal quantity of lead in a deep iron vessel, stirring the two metals together, and skimming off the impurities as they rise to the surface. Powdered charcoal must be constantly placed on the surface of the molten metal to prevent oxydation. After keeping the two metals thus fused together for about three hours, the lead descends to the bottom on account of its greater density and the zinc floats above it and may be drawn off by a pipe at the side of the iron smelting vessel.

I. C. S., of Mich.—Your idea of propelling a boat is not new. The same thing has been done before, but we cannot recommend the plan. It is inferior to others.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, Oct. 9, 1861:—

T. W., of Ill., $25; B. G. H., of Pa., $25; T. M., of N. Y., $15; H. & R., of N. Y., $53; E. E. H., of Wis., $15; E. K. J., of Cal., $35; J. B., of Ill., $25; R. P. W., of O., $15; J. S. W., of Va., $15; H. H. W., of N. Y., $30; G. R. S., of Iowa, $35; G. & H., of Mass., $30; J. L. T., of N. Y., $45; G. F., of N. Y., 20; T. H. of L. I., $43; J. W. H., of N. J., $20; C. F. L., of Pa., $20; H. & Bros., of N. Y., $20; C. Van H., of Mass., $20; H. J. & T. H. B., of N. J., $40; J. W., of Conn., $15; W. M. M., of Ill., $25; B. A. M., of Conn., $15; H. & M., of Iowa, $25; J. M. C., of O., $25; J. W. G., of Mass., $15; E. B., of Conn., $15; S. P. P., of N. Y., $15; S. B., of Conn., $25; J. M. M., of N. Y., $25; La B. & R., of Ill., $15; C. K. McL., of N. J., $15; T. K. A., of N. Y., $20; V. & N., of N. Y., $20; B. & B., of Pa., $20; M. M. P., of Vt., $45; J. H. I., of Ill., $20; W. R. L., of Conn., $30; M. B. W., of N. Y., $15; A. Y., of O., $10; J. M. F., of Ill., $25; J. S., of N. Y., $15; O. M. T., of N. Y., $15; H. G., of N. Y., $15; L. C. P., of Conn., $45; C. E. H., of Mich., $15; J. P., of N. Y., $20; N. S. & I. L. H., of Mass., $15; I. S. K., of Pa., $15; J. J. M., of N. Y., $28; C. B., of N. Y., $20.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Oct. 2, to Wednesday, Oct. 9, 1861:—

T. W., of Ill.; H. J. and T. H. B., of N. J. (2 cases); B. G. H., of Pa.; J. R. G., of Ky. (2 cases); B. H. & Co., of Cal.; T. S., of Cal.; J. V. H., of Ill.; J. W. F., of Ill.; C. T., of Conn.; H. and M., of Ill., W. M. M., of Ill.; H. and P., of N. Y.; J. H., of N. Y.; R. R. G., of Ill.; B. W. D., of N. Y.; J. B., of Ill.; W. R. L., of Conn.; J. M. C., of Ohio; P. H., of L. I.; J. J. M., of N. Y.; G. and H., of Mass.; J. M. M., of N. Y.; G. R. S., of Wis.; S. B. of N. Y.; J. R., of N. Y.

RATES OF ADVERTISING.

Thirty Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

CHANGE IN THE PATENT LAWS.

PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 4th of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

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Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Testimonials.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the acts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not mit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued n obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, o prepare arguments, and appear before the Commissioner of Patents, or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors*," Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fee, by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited For further particulars, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

NEW YORK OBSERVER FOR 1862.—IN ASKING the aid of all who may desire to extend the circulation of the *New York Observer*, it is proper for us to state distinctly the position it occupies with reference to the present condition of public affairs in our beloved country.

Having always maintained the duty of good citizens in all parts of the land to stand by the Constitution, in its spirit and letter, when that Constitution was assailed and its overthrow attempted, we accordingly at once gave a cordial support to the Government in its patriotic endeavor to assert its lawful authority over the whole land. Believing secession to be rebellion, and when attempted, as in this case, without adequate reasons, to be the highest crime, we hold

1. That the war was forced upon us by the unjustifiable rebellion of the seceding States.
2. That the Government, as the ordinance of God, must put down rebellion and uphold the Constitution in its integrity.
3. That every citizen is bound to support the Government under which he lives, in the struggle to reestablish its authority over the whole country.
4. That the Constitution of the United States is the supreme law of the Government as well as of the people; that the war should be prosecuted solely to uphold the Constitution and in strict subordination to its provisions: and the war should be arrested, and peace concluded, just so soon as the people now in revolt will lay down their arms and submit to the Constitution and laws of the land.

The distinctive features of the *Observer* are,

1. It is printed on a double sheet, so as to make two complete newspapers, one devoted to secular and the other religious matters; and these may be separated so as to make two complete journals, while the price for both is no greater than is charged for many papers smaller than either one of the two.
2. It gives every week a complete synopsis of the most interesting events in all the denominations, including those that are called Evangelical and those that are not; as every intelligent Christian wishes to be well informed respecting all of them.
3. It gives a well-digested epitome of the News of the Day, Foreign and Domestic, prepared with great labor and care, so that the reader is sure to be put in possession of every event of interest and importance to the public.

The foreign correspondence of the *Observer* is unrivaled, and has long commanded the admiration of intelligent men.

TERMS FOR NEW SUBSCRIBERS.

1. To each new subscriber paying in advance $2 50 for one year, we will send the paper and a copy of our Bible Atlas, with five beautiful colored maps.
2. To the person obtaining subscribers we will give $1 for each new subscriber paying $2 50 in advance.
3. To any person now a subscriber sending us one new subscriber and $4 we will send both papers for one year.

Specimen numbers of the *New York Observer* will be sent gratis to any address that may be forwarded to us for that purpose.

The state of the country renders it important for us and desirable for the churches, that a new and earnest effort be made to extend the principles of good government and sound religious truth into all the families of the land. In every neighborhood there must be some who do not now take a religious newspaper, and who might with a little exertion be induced to subscribe.

SIDNEY E. MORSE, JR., & Co.,
Editors and Proprietors,
tf. 37 Park Row, New York.

TO LUMBER DEALERS AND CONSUMERS.—YOUR attention is respectfully directed to the North Chatham Saw mill. Capacity 6,000,000 feet per annum. E. S. Williams, Proprietor This mill is conveniently located for shipping by water or rail. Freigh to Buffalo $2 to $4. Black Walnut, Cherry, White Oak, White Ash Rock Elm, Whitewood, and Sycamore Lumber sawed to specifications and supplied in any quantities. Orders for Spring delivery should be forwarded by the 15th December, and are respectfully solicited. N. B. The Oak, Ash, and Rock Elm of this vicinity is pronounced the toughest and best that grows on this continent. Our Walnut, Whitewood, and Sycamore is unsurpassed. Address,

D. R. VAN ALLEN, Agent,
1* Chatham, Canada West.

LARGE CAST IRON SHEARS, WEIGHING ABOUT 3 tuns, and adapted to cutting all sizes of iron. For sale by
1* SAMUEL BOYD, 23 Platt-st., New-York.

$12 IN A DAY HAVE BEEN EARNED IN SEVERAL instances by agents canvassing and selling Atwater's Patent Press and Book for copying business letters quickly and well. Thousands have been sold and give good satisfaction. Sent postpaid for $1 27. Send stamps for particulars. J. H. ATWATER, Providence, R. I. 1*

TO PATENTEES AND OTHERS.—THE ADVERTISER being desirous of visiting Europe would like to secure a business engagement of a few months, at a nominal compensation. Is a thorough mechanic and business man. Would prefer securing patents, or some mechanical business. Unexceptional reference given as to integrity, capacity, &c. Address Box 1,487, New York Post Office. 1*

FOR SALE OR EXCHANGE FOR A SMALL PLANER, a Milling Machine, for gun or similar work, of the best make, nearly new, and in complete order. WOOSTER & GLOVER, Birmingham, Conn. 3*

TO WATCH MANUFACTURERS.—WANTED TO PURchase, on reasonable terms, an interest in an established Watch Manufactory, having the facility and machinery to produce the three-quarter plate style of watch, with fuzee and chain. Address J. MUMA, Hanover, York Co. Pa. 1*

TO GUNBOAT BUILDERS.—STEAM AND WATER Gages, Glass Tubes, Indicators, Patent Gage Cocks, Steam Whistles, and Signal Gongs. Send for prices. E. BROWN, 311 Walnut street, Philadelphia, Pa. 1*

ATMOSPHERIC TRIP HAMMER FOR SALE.—SUITable for forging Gun Barrels, Swords, &c., with capacity to do an immense amount of work. It is graduated to give heavy and light blows, either slow or at great speed. SAMUEL BOYD, 23 Platt street, New York. 1*

ALBANY IRON WORKS, TROY, N. Y.—SEMI-STEEL Plates and Forgings.—We are prepared to furnish forged shapes of this approved metal, and without unnecessary delay, having large facilities for production. Among the uses to which this material is now applied, and with great success, we name, rifled cannon for government use; also rifle and musket barrel shapes, locomotive engine tires, locomotive engine axles, straight and crank, car axles, crank pins, plates for locomotive fire box, flue sheets, &c. It is peculiarly adapted for shafting, indeed, for all purposes where strength and rigid qualities are required, its tensile strength ranging from 90,000 to 118,000 lbs. to the square inch, nearly double that of the best iron.—Cast-steel forgings up to 1,500 lbs. each, likewise furnished. Communications addressed to CORNING, WINSLOW & CO., A. I. Works, Troy, N. Y., will be promptly responded to. Parties at the West can be supplied on addressing their orders to A. S. WINSLOW, Cincinnati, Ohio. 15 6m

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HOMINY MILLS—EVERY GRIST MILL SHOULD have one.—J. Donaldson's Self-Feeding, Discharging, Separating and Grading Hominy Mill, is the only one in use. It works the corn dry yet hulls it perfectly. It will also hull oats, barley, rice, and split and hull peas. Can be run by horse or steam power, and can be set from one to four-horse power. It hulls from 10 to 50 bushels of corn per day; it weighs 300 lbs., occupies a space of three feet square, is not liable to get out of order, and is reliable in every particular. Price of mills at the shop:—Small size, $80; large size, $100. Territorial rights sold low or exchanged for western lands. Address J. DONALDSON, Rockford, Ill. 15 3*

NONPAREIL WASHING MACHINE.—THIS Machine must take precedence of all other machines now in use, being the only one justly entitled to be considered as constructed on correct mechanical principles. Machines and State and county rights for sale by OAKLEY & KEATING. 73 South street, New York. 15 3m

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HOSTETTER'S BAG HOLDER AND CONVEYER, FOR filling and conveying bags. Price $5. Patent for sale.
13 5* J. R. HOFFER, Mount Joy, Pe.

BRASS LIFT AND FORCE PUMPS, SHIP PUMPS, Steam Whistles, Gage Cocks, Oil Cups, and every variety Brass Work used by engine builders, manufactured by HAYDEN, SANDERS & CO., 84 Beekman street, New York. 14 13*

GUILD & GARRISON'S CELEBRATED STEAM Pumps—Adapted to every variety of pumping. The principal styles are the Direct Action Excelsior Steam Pump, the improved Balance Wheel Pump, Duplex Vacuum and Steam Pumps, and the Water Propeller, an entirely new invention for pumping large quantities at a light lift. For sale at Nos. 55 and 57 First street, Williamsburgh, and No. 74 Beekman street, New York.
9 tf GUILD, GARRISON & CO.

IRON PLANERS, ENGINE LATHES, AND OTHER MAchinists Tools, of superior quality, on hand and finishing, and for sale low; also, Harrison's Grain Mills. For descriptive circular, address NEW HAVEN MANUFACTURING CO., New Haven, Conn. 1 26

PUMPS! PUMPS!! PUMPS!!!—CARY'S IMPROVED Rotary Force Pump, unrivaled for pumping hot or cold liquids. Manufactured and sold by CARY & BRAINERD, Brockport, N. Y Also, sold by J. C. CARY, No. 2 Astor House, New York City. 14tf

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MACHINE BELTING, STEAM PACKING, ENGINE HOSE.—The superiority of these articles, manufactured of vulcanized rubber, is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The Hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise at our warehouse. NEW YORK BELTING AND PACKING COMPANY.

JOHN H. CHEEVER, Treasurer,
1 13 Nos. 37 and 38 Park-row, New York.

SOLID EMERY VULCANITE.—WE ARE NOW MANUfacturing wheels of this remarkable substance for cutting, grinding and polishing metals, that will outwear hundreds of the kind commonly used, and will do a much greater amount of work in the same time, and more efficiently. All interested can see them in operation at our warehouse, or circulars describing them will be furnished by mail.

NEW YORK BELTING AND PACKING CO.,
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SWISS DRAWING INSTRUMENTS.—CATALOGUE (7TH edition), containing over 250 illustrations of Mathematical, Optical and Philosophical Instruments, with attachment of a large sheet representing the genuine Swiss Instruments, in their actual size and shape, will be delivered on application to all parts of the United States (gratis), by C. T. AMSLER, No. 635 Chestnut-street, Philadelphia, Pa., established agency for the Swiss Drawing Instruments since 1848.

Being about to retire from business, I have sold my stock of Swiss Mathematical Instruments to Messrs. MCALLISTER & BROTHER, of No. 728 Chestnut street, Philadelphia who will continue to keep such for sale, and to whom I refer my former friends and customers

C. T. AMSLER

Philadelphia, Pa., June 12, 1861.

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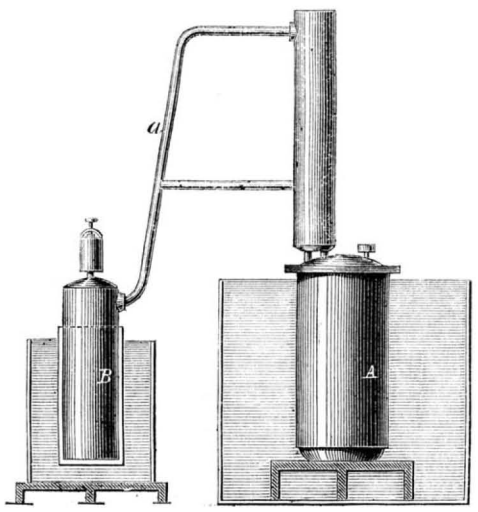
Apparatus for Making Ice.

[Invented by Carré & Co., Paris, France.]

This apparatus, which is portable and which can be used in every family and every place where fire can be had, is based on the fact, that water when cold absorbs a large quantity of ammoniac gas, which when the water is heated escapes and condenses in a proper vessel. If this vessel containing the condensed ammoniac is placed in cold water, and connected with another vessel containing cold water, the affinity of the water in the second vessel causes the ammoniac in the first vessel to evaporate very rapidly, and the heat necessary for this evaporation being taken from the water surrounding the first vessel causes this water to freeze.



The apparatus in its simplest form consists of a vessel, A, of cast iron, which connects by means of suitable pipes, *a*, with a second vessel, B. The capacity of the vessel, A, is about three times that of the vessel, B.

The vessel, A, is about three-quarters full with a concentrated aqueous solution of ammoniac gas, and it is now placed on a stove and heated to about 220° Fah. The ammoniac gas is driven out and it condenses in the vessel, B, which is placed in cold water. After a few minutes, the ammoniac gas having been entirely driven out of the vessel, A, said vessel is taken from the stove and placed in a tank containing cold water. The water in the vessel, A, on being cooled absorbs rapidly the ammoniac from the vessel, B, and the water surrounding the latter vessel freezes.

It must be observed, that in order to obtain a good result, the atmospheric air must be expelled from the apparatus before the operation commences. It is also necessary to prevent the vapors of the water passing from the vessel, A, to the vessel, B, since either the presence of atmospheric air or of water renders the condensation of the ammoniac gas in the vessel, B, impracticable.

The writer of this has personally examined this apparatus, and it has been successfully used in conbination with a soda water apparatus, invented by Mr. Thomas Warker, and described in Vol. I. No. 17 of the Scientific American. It does make ice, but it cannot be denied that the apparatus is yet in its infancy, and we have no doubt that our American inventors, when once put upon the track, will soon be able to get up a perfect apparatus, enabling every family to make its own ice whenever it is wanted. With the apparatus as now constructed, 1 pound of coal burned under the vessel, A, will make 4 pounds of ice.

It will be seen that this apparatus is based on the power which substances have of absorbing heat on their conversion from the solid to the gaseous form. It takes 1,000° of heat to change water into steam, and the steam after it has absorbed this 1,000° of heat appears no hotter than the water; measured by the thermometer, they both indicate 212° Fah. The heat, being thus imperceptible, is called hidden or latent heat. The latent heat of steam is greater than that of any other vapor. That of alcohol is 609°, of ether, 314°, of spirits of turpentine, 299°, and of ammoniac 541°.

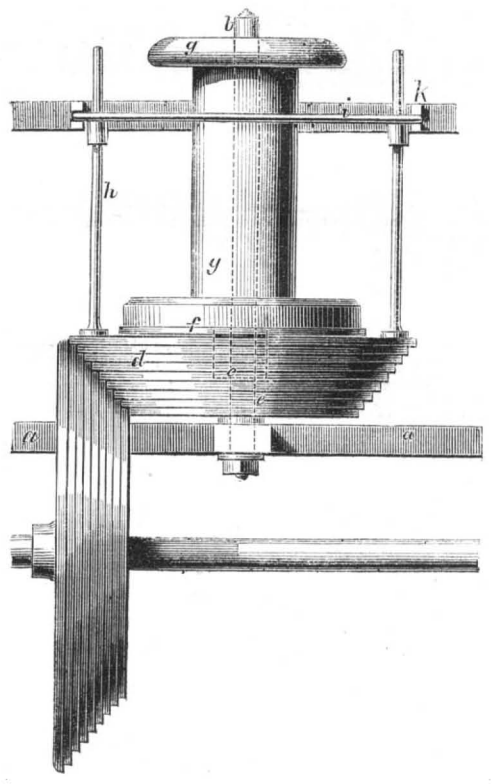
As the liquid ammoniac in the vessel, B, is evaporated it absorbs heat from the surrounding liquid and thus cools the liquid.

WEBSTER'S SPINDLES OF DOUBLE FRAMES.

We transfer the illustration of this invention from the London *Engineer*, partly on its own account and partly for the sake of the representation which it contains of Robertson's frictional gear.

This invention by J. T. Webster, of Mansfield, Notts, has for its object the regulation of the amount of twist imparted to any given length of fiber as it passes to the spindle of the doubling frame or throstle spinning frame, and also the prevention of the objectionable loss of power which is consequent upon allowing the bobbin to drag upon the lifting rail, as ordinarily practiced. This improvement consists in so constructing the spindles of doubling frames or machines for twisting fibrous substances or materials that any determined amount of twist may be given to the thread as it passes on to the bobbin upon the spindle. This object is to be effected by driving the spindles and bobbins separately, instead of causing the "drag" of the thread to drive the latter, as usually practiced; and the relative difference of the speeds at which they are severally driven must be so adjusted as to give the desired amount of twist to the thread. The spindle and bobbin may be driven either by cords or bands, toothed gearing, or by friction; but it is preferred to use grooved frictional gearing, as constructed by Mr. James Robertson, of Glasgow, and now well known as "Robertson's frictional gear."

In Fig. 1, *a* is the spindle rail, in which are fixed, by nuts, the stationary spindles or studs, *b*, upon which are placed, so as to revolve freely, two frictional wheels or cones, *c d*. Upon the lower cone, *c*, a long socket or boss, *e*, is attached, upon which the wheel or cone, *d*, revolves freely, and to the upper end of which socket is fastened the plate or washer, *f*, of sufficient diameter to carry the bobbin, *g*. To the upper wheel or cone, *d*, is attached an apparatus answering the purpose of the ordinary flyer. This con-



sists of a plate having two upright rods or guides, *h*, upon which the ring, *i*, is free to slide up and down. The thread passes through a hole in the ring, *i*, and is thus guided on to the bobbin. To effect the placing of the thread regularly over every portion of the bobbin, the ring, *i*, is carried between the jaws, *k*, projecting from the lifting rail, *l*, which latter is traversed up and down by means of the ordinary mangle-wheel motion, or by any other motion ordinarily employed for lifting the bobbin rail in such frames.

The Prussian Navy.—*Galignani* says:—"An official document just published in Prussia shows that the navy of that country consists at present of 40 vessels, including those in course of construction—namely, 2 frigates, 4 corvettes, 1 brig, 2 transports, 3 advice boats, 1 vessel for lodging troops, and 27 gunboats. There are, in addition, about 40 boats and other light vessels."

More Tampering with Railroad Bridges.—A gentleman of Zanesville, who was on the first train which passed over it some days ago, reports to the Zanesville *Courier* that a railroad bridge, seven miles west of Xenia, and in the direction of Dayton, was damaged so as to make it unsafe for trains to pass over it. It was found on examination that braces and other timbers had been removed, and if a train had ventured on the bridge it would have given way. The bridge was repaired in short order. It had been arranged to send a large body of troops over it that night, but from some cause or other they were sent by a different route, and therefore no harm was done.

The bids for building five revenue cutters, advertised for by the Secretary of the Treasury, have been received at Washington. Propositions were made by a number of leading shipbuilders in New York, Boston, Philadelphia, Baltimore and other places. The awards will not be determined for several days.

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